

# MANUFACTURERS' RECORD

A WEEKLY REVIEW OF THE IRON, STEEL, METAL & HARDWARE TRADES.

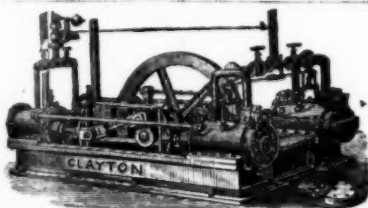
AND A MANUFACTURING AND TEXTILE PAPER, DEVOTED TO THE UPBUILDING OF SOUTHERN MANUFACTURES AND THE DEVELOPMENT OF THE MATERIAL RESOURCES OF THE SOUTH.

VOL. 6. No. 17.  
WEEKLY.

BALTIMORE, DECEMBER 6, 1884.

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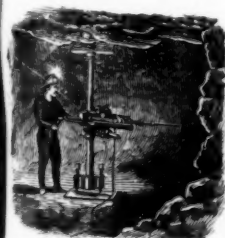
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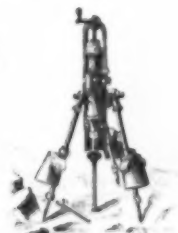
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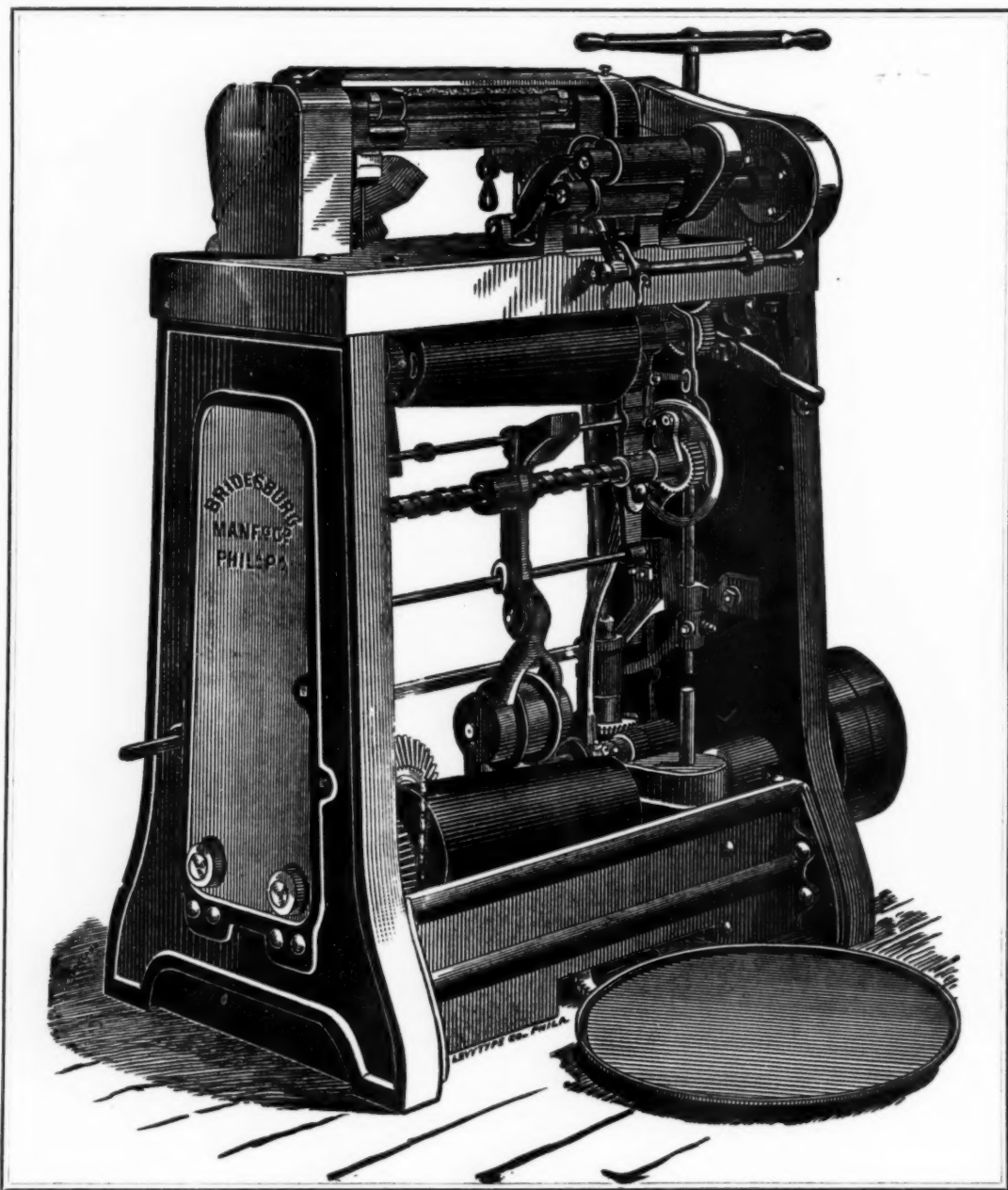
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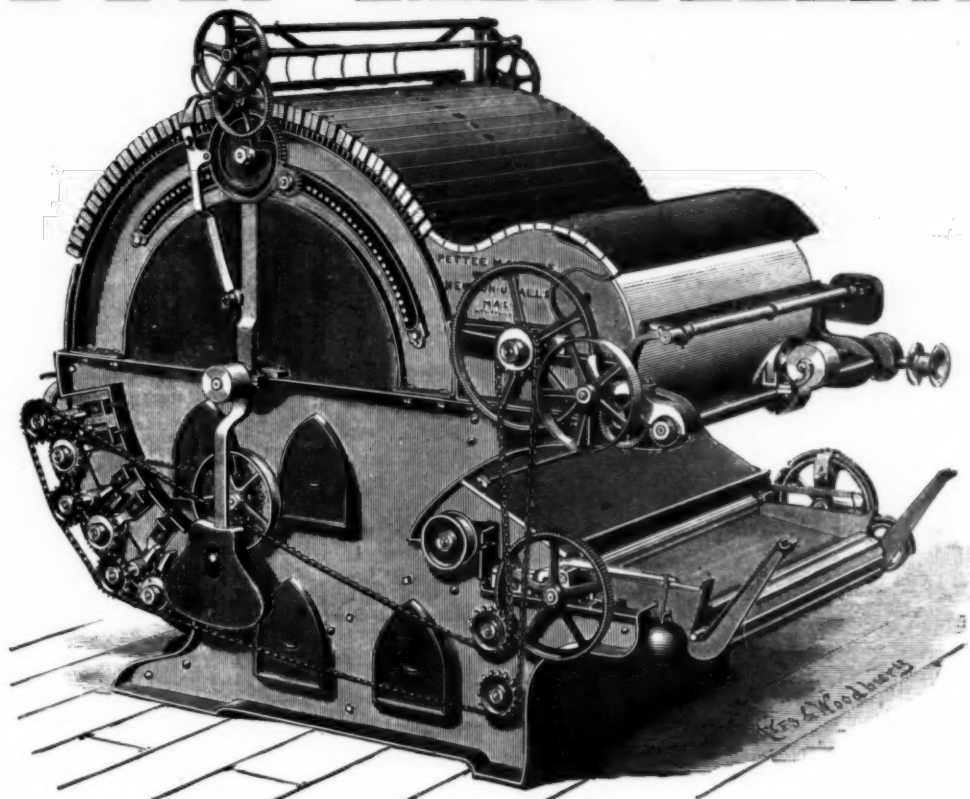


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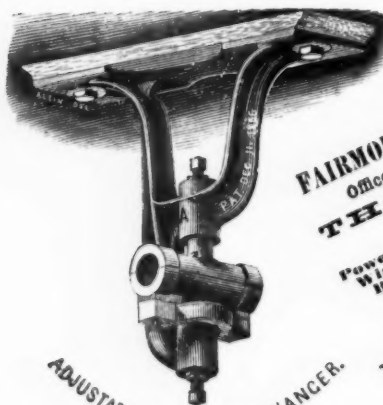
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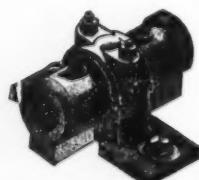
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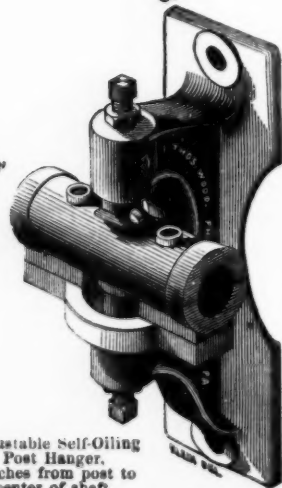
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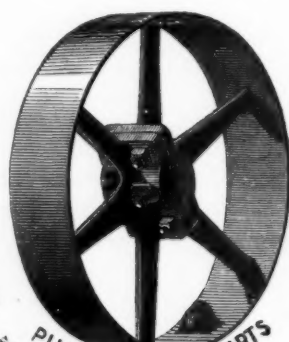
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6 inches from post to  
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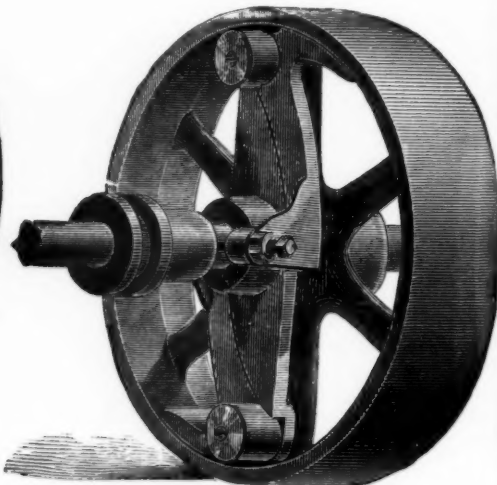
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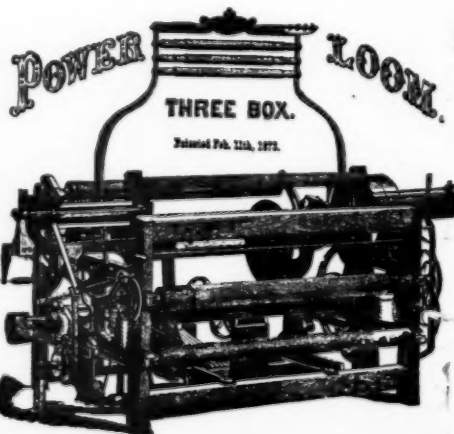
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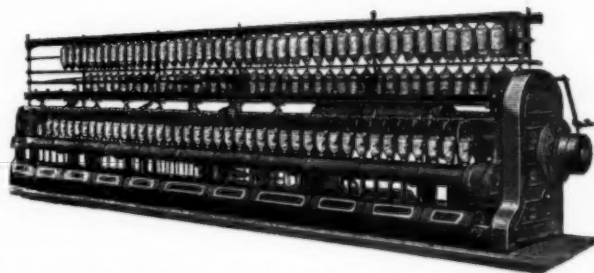
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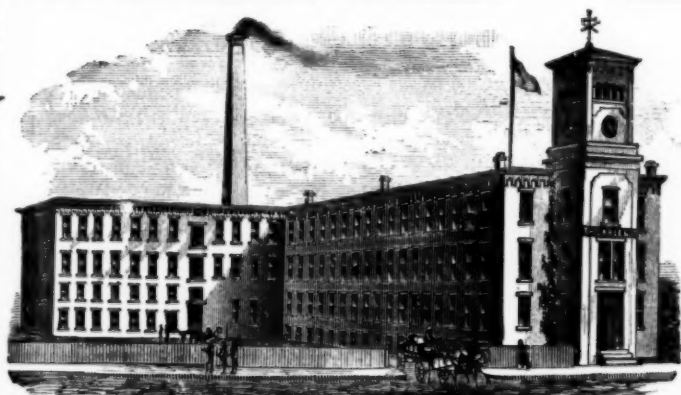
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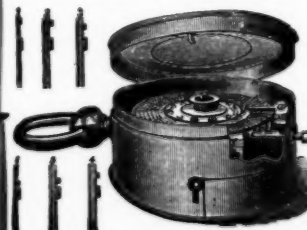
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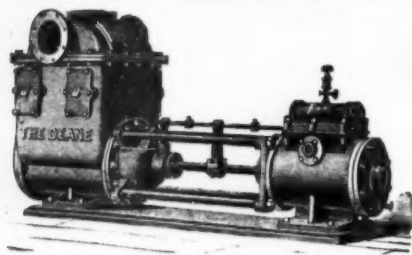
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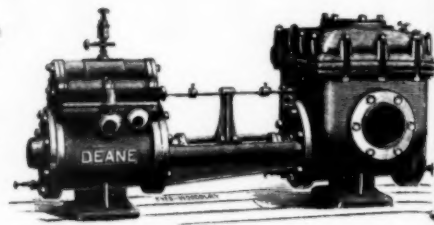
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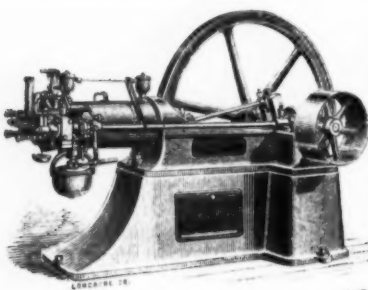
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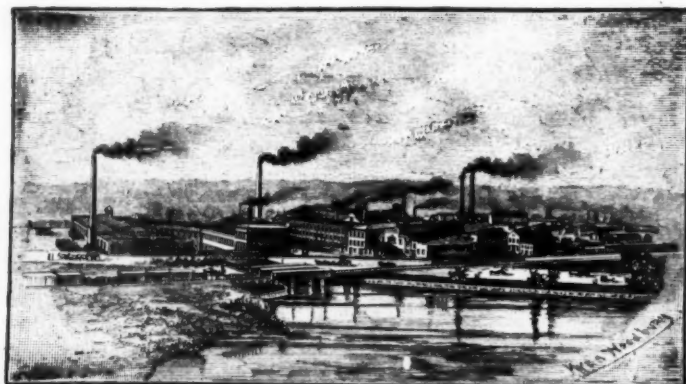
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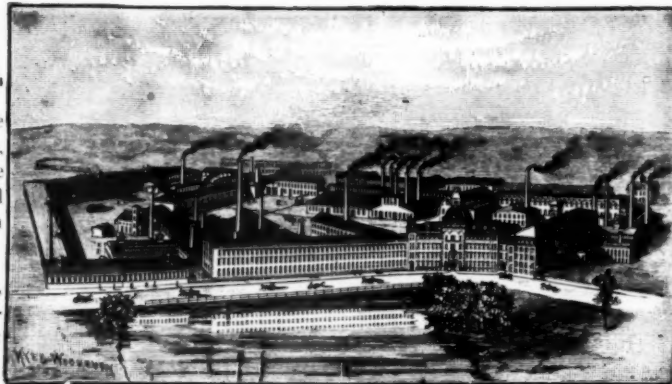
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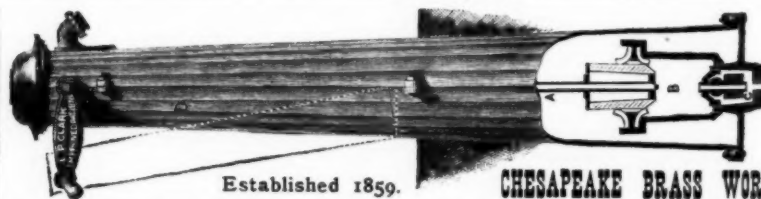
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BALTIMORE, DECEMBER 6, 1884.

A BOOK entitled "The New South," by Col. M. B. Hillyard, of New Orleans, whose ability to do impartial justice to that section of the United States is beyond question, is in course of publication in Baltimore by Messrs. Bigsby & Edmonds, of the MANUFACTURERS' RECORD. The book will treat of the special resources of each State, its soil, climate, mineral wealth, industries, &c. It is a work that has long been needed.—Baltimore *Sun*.

CORRESPONDENCE relating to the manufacturing, mining, lumbering and all other material interests of the Southern States is solicited. We invite those interested in the development of the South to make free use of our columns. Reaching so many capitalists in all parts of the United States seeking profitable investment in the South, the MANUFACTURERS' RECORD offers an excellent chance for the people in that section to place the advantages of each locality before those likely to be interested. We will take great pleasure at all times in telling what has already been accomplished in the South, and showing up the opportunities of doing still more,—so if you desire to attract immigration or capital, or if you know of an opening for profitable investment in manufacturing, mining or kindred pursuits, write us an account of it. It will be published free of cost.

Our readers will confer a favor upon our advertisers and upon us, as well as benefit themselves, if, whenever they write to anyone advertising in this paper, if it is only for a catalogue, they mention that "your advertisement was seen in the BALTIMORE MANUFACTURERS' RECORD." A careful compliance with this request will be much appreciated.

## Some Signs of Improvement.

That there is a very general depression in trade and manufactures everyone knows, but we do not believe that it is quite as severe as some claim, and while reports of mills and factories shutting down, and of wages being decreased, are quite numerous, yet there are also many reports of other mills starting up. Many of the mills that are now closing down are only doing so in accordance with a regular custom of stopping work about the end of each year for the purpose of overhauling the works, taking stock, &c., preparatory to starting up after the holidays. With a view to showing that there are many signs of improvement in manufactures in the resumption of work by mills that have been idle, we give the names of those that have been reported within the last three or four days only, and it should be remembered that the starting up of a factory is not near so apt to be reported in the daily papers as the shutting down of one. Among those reported as resuming work have been the following:

THE Elmira rolling mill will resume work Monday morning. Twenty furnaces will be started up, requiring eighty puddlers and the same number of helpers.

PITTSBURGH, PA.—The bar mill at Oliver Bros. & Phillips' Tenth street mill was put on double turn on the 25th inst.

PITTSBURGH, PA.—The general feeling among business men in Pittsburg is daily growing more hopeful. Some large orders for railroad supplies were placed last week with manufacturers and bids for others have been asked for. The feeling among iron men is decidedly better on account of the receipts of fair orders.

EASTON, PA.—The Puddle mill of the Bethlehem Iron Company, which has been idle since the early part of this summer, will resume on December 1st.

GLOUCESTER, N. J.—The Gloucester Gingham mills, which have been idle for three weeks past, thereby throwing about 600 people out of employment, have resumed operations.

TILTON, N. H.—Buell's hosiery mills have commenced work on full time. Ballantyne & Fletcher's Granite woolen mills have also started up. They have been closed since last summer.

PITTSBURGH, PA., Nov. 28.—Shoenburger & Co.'s large iron mills, which have been closed for some time, started up full this morning in all departments, giving employment to upward of 600 hands. The firm have sufficient orders to keep their mills running steadily.

READING, PA., Nov. 25.—The McIlwaine plate mill in this city, which suspended a week ago, resumed to-day.

PITTSBURGH, Nov. 28.—Chess Cook & Co.'s mills, after being shut down several weeks, will start up on Monday.

SOUTH EASTON, PA.—The nine mills of Stewart & Co. have resumed.

PITTSBURGH, November 24.—The Frankstown Rolling mill, which has been idle four months, resumed operations to-day, and, it is thought, will be kept running all the winter. It is expected that the new pipe mill recently built by the same firm will start up Wednesday, and give employment to about 600 men.

THE Norway Steel and Iron Company, at South Boston, will soon start two more Siemens-Martin furnaces for the manufacture of steel, thus giving employment to over 500 men.

FALL RIVER, MASS., Nov. 28.—All the mills started up this morning. There is a decidedly good feeling among manufacturers caused by the stiffening in the prices of print cloth. The mills will all run here next week, and the general opinion is that it will not be necessary to stop during the winter.

PITTSBURGH, PA.—The Elba Iron and Bolt Company's works, which have been idle for a few months, have resumed operations.

LEMONT Furnace, near Uniontown, Fayette county, Pa., was blown in on Thursday of last week, after an idleness of more than a year.

PHILLIPSBURG, PA.—The Andover Furnace Co. have started up one of their blast furnaces.

THE Hellertown Iron Company's furnace, recently purchased by the Thomas Iron Company, which has been idle over eight months, is being put in order, and after the repairs are completed, the furnace will be blown in.

CHATTANOOGA, TENN., Nov. 24.—Since November the 10th there has been a constant increase in the iron business throughout this section. Work has been resumed at five ore banks in North Alabama, and fully three hundred coke ovens have been fired up owing to the increased demand from the furnaces. Ore has been advanced 10 per cent. within ten days.

The manager of the largest furnace in this neighborhood states he has orders to run the furnace four months. He has refused to contract to deliver pig iron at present price after January 1st. The Citico furnace is filling an order for 5,000 tons for a Philadelphia foundry.

CHESTER, PA.—The mills of the Tilley Manufacturing Company, which have been idle for some weeks, have resumed.

LONACONING, MD.—The New Central Coal Co. have a force of men engaged putting their Big Vein mine in repair preparatory to resuming work. The mine will be in readiness for operation by December 1st. This mine has been idle since last May and its resumption will give employment to a number of men now idle.

WILKESBARRE, PA.—An order issued by the combination for a general suspension of work at the mines the first week in December has been rescinded.

NEARLY all departments of the Cleveland Rolling Mill Company's works are now started up.

THE Westinghouse Machine Company, Pittsburgh, started in operation last week, after an idleness of three weeks for repairs. The works have been very considerably enlarged.

ARRANGEMENTS have been made for the immediate resumption of the Rock Island Plow-Works, Rock Island, Ill., which will give employment to 400 hands. The Rock Island Plow Company, a new organization with a paid-up capital of \$350,000, succeeds B. D. Buford & Co.

HOGSETT's blast-furnace, at Pittsburg, Pa., was blown in November 20th, after being out of blast for over a year.

THE Gautier wire mill, at Johnstown, Pa., which has been idle for a number of weeks for repairs and to reduce stock on hand, has started up on one turn. It is probable that, as soon as the warehouses are cleared of the manufactured articles, the employees will be put on double turn.

CHATTANOOGA, Nov. 29.—The Chattanooga Cotton Factory, which has been shut down for several months, will resume operations this week.

PHOENIXVILLE, PA., Dec. 1.—The Phoenix Iron Company, located at Phoenixville, has started up every department of its immense works on continuous turns night and day, giving employment to thousands of workmen, and with the assurance of continued orders.

WATERBURY, CONN., November 29.—Manufacturing here does not seem to be suffering very much from the general depression. It is noted that Benedict & Burnham this week received a single order for 600,000 pounds of metal. The Waterbury Clock Co. reports business better than for a long time. The American Ring Co. reported recently duller than for ten years. It is now running over time. Another significant fact is that most of the shops started up again the day after Thanksgiving, instead of shutting down for the balance of the week, as is customary when warranted by condition of business.

The forgoing reports will show that while many mills are shutting down, or reducing wages, there are many that have lately started up with good prospects for the future.

## Southern Pig Iron in the North.

The large shipments of Southern pig iron to Northern markets during the last few months have attracted considerable attention, and there has been much speculation as to whether or not these shipments would continue. In its last issue Bradstreet devotes considerable attention to this subject, and shows that there are good reasons for believing that Southern iron makers will continue to hold the ground which they have already gained. This, of course, depends very largely upon the rates of freight, and, it is believed, that Southern transportation companies will find it to their advantage to give such rates as will encourage this business. The shipments of pig iron from the South to the cities of Philadelphia (some to Pittsburgh), Wilmington, Del., Elizabeth, N. J., New York, New Haven, Stamford and Bridgeport, Conn., Providence and Boston since January 1, 1884, by States, have been as follows:

SOUTHERN PIG IRON SHIPPED TO THE EAST, 1884.			
Coke pig, tons in 1884.		Charcoal pig, tons in 1884.	
From Virginia.....47,709		From Virginia.....5,300	
" Alabama.....5,630		" Alabama.....2,990	
" Georgia.....3,350		" Tennessee.....900	
" Tennessee.....3,825		" Maryland.....3,447	
" Maryland.....1,500		" Kentucky.....1,800	
" Kentucky.....350			
Total coke iron.....62,374		Total charcoal iron.....15,737	
Total shipments east of Southern pig iron 1884, tons.....78,111			

While we are glad to see Southern iron makers finding a market for the product of their furnaces, yet it is to be regretted that so large an amount of Southern iron must seek a consuming market elsewhere than near where it is to be made. It would be vastly to the benefit of the South and all its industries if there were sufficient diversified industries in that section to consume the iron manufactured there, instead of its being shipped North at an expense of \$4 to \$5 a ton, and there manufactured and reshipped to the South in the shape of stoves, machinery, agricultural implements, &c.

SALISBURY, N. C., feels the need of tobacco factories, and so her business men have agreed to furnish two factories, rent free, for one year, and possibly longer, to any one tobacco manufacturer locating there.

## Wytheville as a Manufacturing Centre.

WYTHEVILLE, VA., Nov. 29, 1884.

Editor Baltimore Manufacturers' Record:

Recognizing the valuable aid your journal is lending in drawing the attention of capitalists and manufacturers to the splendid resources of the South, I beg the use of its columns for the purpose of furnishing a few facts with regard to the future outlook of Wytheville as a manufacturing town. The principal requisites for a manufacturing centre, are an abundance of water, a sufficiency of raw material, cheap fuel and cheap transportation. Wytheville is well favored in the first particular, and as to the second there is no lack of wood and iron. (Wythe county standing among the first in the production of pig iron in the State of Virginia.) With regard to the other two requisites some explanation is necessary. Within twenty miles of Wytheville in a north-western direction, across Walker's mountain, a spur of the Alleghenies, are the great coal fields of Tazewell and adjoining counties. It was for the purpose of securing fuel, by a direct route from these fields, as well as to obtain a share in the trade of this wealthy section, that some of the citizens of Danville, Va., secured a charter for a railroad known as the Virginia & Kentucky Railroad, which will be a continuation of the Danville & New River Railroad, and will connect that city with these beds of coal, and which will intersect the Norfolk & Western Railroad at Wytheville.

The question of subscription of \$200,000 to this road by three of the counties through which it passes (which subscription is not to be paid until the road is built and equipped) was put to the people of their respective counties on the 4th inst. and carried. Since that time I have been informed by the managers of the road that they expect to commence work on it next spring and push it rapidly to completion. This will furnish Wytheville with two competing lines of road, both for the purpose of securing its coal and iron, and in shipping its manufactured articles. This will also open up to the trade of Wytheville, an as yet partially developed country, but which only awaits the introduction of the new life which will accompany the building of the road to become exceedingly productive.

Wytheville is already a manufacturing town of no mean pretensions. In order to show this it may be necessary to cite one or two instances where the establishment of manufactories has proven successful. As an example, the plow factory and machine shops of H. E. McWane & Co. began operations about 5 years ago on a capital, all told, of \$10,000. From the profits of its business alone this firm has added to its capital from year to year, and extended its facilities until to-day its shops cannot be bought for \$30,000, and they are prepared to make anything from a plow point to a saw mill. The marble works of John A. Rowe may also be mentioned to show what thrift and enterprise may accomplish here. I cannot go into detail but will mention in this connection two carriage and wagon factories; two furniture manufactories; two flouring mills; three tanneries; one tobacco shook and barrel hoop factory, each of which is doing a paying business.

Wytheville is at present a place of 3,000 inhabitants with a fine back tier of country for trading purposes, as its twenty-eight stores will signify. There are also in the place six hotels, two banks, three female colleges, three male schools and two newspapers. The real estate business is represented by the firm of G. J. Holbrook & Co. The town is beautifully laid out in squares intersected by streets, which will vary in width from 85 to 95 feet.

We invite inspection, inquiry and immigration, and will give a warm welcome to those who desire to settle among us.

M. M. CALDWELL,  
Editor Enterprise.

## Cotton Statistics.

### Where to Go in the South to Plant Cotton.

SOUTHERN OFFICE,  
BALTIMORE MANUFACTURERS' RECORD,  
ATLANTA, GA., Nov. 28, 1884.  
VIRGINIA.

Virginia is not much of a cotton State. Of 40,125 square miles, only 4,420 are given to the raising of cotton. Of a population of 1,512,565, only 157,699 are engaged in cotton farming. Of 7,358,030 acres of tilled land, only 773,611 acres are in the cotton region, and only 5.82 per cent. of these, or 45,040 acres are in cotton. The proportion runs that about one-tenth of the area of the State is cotton region, and of this tenth, one fourth or 1-40 only of the State is planted in cotton.

There are two cotton regions: 1st. The tide water of the 7 counties of King, Prince George, Sussex, Isle of Wight, Nansemond, Southampton and Greensville. 2d. The oak uplands region of 3 counties—Dinwiddie, Mecklenburg and Brunswick.

The tidewater of 7 counties has 2,690 square miles, with 83,512 people, 463,550 tilled acres, of which 6.38 per cent. or 29,590 acres is in cotton, producing 13,170 bales,—an average of 45 per cent. to the acre, the cotton acreage per square mile being 11.00.

The oak upland region has 1,730 square miles, with 74,187 people, 310,061 acres tilled land, of which 15.45 or 4.8 per cent. are in cotton, producing 6,425 bales, an average of 42 per cent. an acre and 8.92 per cent. cotton acreage to the square mile.

The tide water region, with nearly double the production of cotton and double the cotton area, though with less than one-eighth more people, raised 1,646,409 bushels of corn, 196,048 bushels Irish and 274,173 sweet potatoes, 169,838 bushels oats and 81,367 wheat.

The oak uplands region raised 6,514,964 pounds tobacco, 948,880 bushels corn, 30,372 bushels Irish and 72,229 sweet potatoes, 296,249 bushels oats and 182,432 wheat.

As we have seen, the oak uplands region, with three counties that has  $\frac{1}{2}$  less people only and  $\frac{1}{2}$  less area, makes  $\frac{1}{2}$  less cotton, and is a better rice, oat and wheat section than the tide water region, while the latter is a better corn and potato section.

Virginia ranks 5th in population, 12th in cotton production, and 8th with North Carolina in average product per acre 0.44 of a bale.

The banner counties in Virginia are these:

Product per acre in bales.	Rank in product per acre in State.
11,500	1
5,200	2
2,950	3
6,800	4
8,500	5
2,150	6
975	7
0.48	8
0.45	9
0.43	10

The counties that produce cotton are ten, and lie in the southeastern angle of the State, between James river and the North Carolina line. The Virginia cotton section is a continuation of the North Carolina cotton belt. Cotton as in North Carolina has invaded the tobacco territory through the instrumentality of the commercial fertilizer. In North Georgia, too, the commercial fertilizer has caused a remarkable spread of cotton production by hastening the season. However, the peanut cultivation and better tobacco culture are contending with cotton in Virginia.

### THE ATLANTIC STATES.

Let me now give a sort of review of the Atlantic cotton States that I have dealt with: Alabama, Florida, Georgia, South Carolina, North Carolina and Virginia. I will give the counties in each State having the highest total production and also highest product per acre.

### COUNTIES WITH HIGHEST TOTAL PRODUCTION:

Rank in product per acre in State.	Rank in total production in State.	Product per acre in bales.	Total production in bales.
1	1	33,534	115,631
2	2	133	37,500
3	3	159	87,350
4	4	181	93,797
5	5	239	59,916
6	6	215	11,500

### COUNTIES WITH HIGHEST PRODUCT PER ACRE:

Rank in product per acre in State.	Rank in total production in State.	Product per acre in bales.	Total production in bales.
1	1	461	638
2	2	133	10,368
3	3	230	5,196
4	4	976	23,785
5	5	301	944
6	6	839	4,100

From these two tables we find that the States on the Atlantic coast rank as follows: In the highest total production of any single county, South Carolina 1st, Alabama 2d, North Carolina 3d, Georgia 4th, Florida 5th, Virginia 6th.

In highest cotton product per acre the States stand as follows: Alabama 1st, North Carolina 2d, South Carolina 3d, Georgia 4th, Virginia 5th, Florida 6th.

The following table will put it clearly:

Highest product per acre.	Rank in product per acre in State.	County.
376	1	Marlborough...
461	2	Baldwin...
301	3	Brunswick...
230	4	Polk...
133	5	Jefferson...
239	6	Greenville...

South Carolina is first, in having the county with highest total cotton production and 3d in having county with highest product per acre. Alabama is second in highest total product and 1st in highest per acre. North Carolina is 3d in highest total and 2d in highest per acre. Georgia is 4th in both. Florida is 5th in highest total and 6th in highest per acre, and Virginia just the reverse.

To understand the matter clearly I give the rank of these States in cotton production:

Rank in product per acre in State.	Rank in total production in State.	Product per acre in bales.	Total production in bales.
1	1	33,534	115,631
2	2	133	37,500
3	3	159	87,350
4	4	181	93,797
5	5	239	59,916
6	6	215	11,500

Georgia is 1st, Alabama 2d, South Carolina 3d, North Carolina 4th, Florida 5th, Virginia 6th in total production. The highest average per acre belonged to North Carolina, and Virginia 1st, South Carolina 2d, Georgia 3d, Alabama 4th and Florida 5th.

I. W. AVERY.

"THE NEW SOUTH" will be a valuable publication for all who want to know what the South has to offer to the capitalist, the settler, or the tourist.

ELSEWHERE will be found the prospectus of a book on the South shortly to be issued by the publishers of the MANUFACTURERS' RECORD. Its aim and scope are fully set forth in the advertisement, of which we ask a careful reading. The South is now a point of attraction for the whole world. Capitalists of our own and other lands are looking for investments in its bed of coal, its exhaustless mines of iron ore, its vast forests of timber, in the manufacture of its cotton, in the utilization of the water power afforded by its countless streams. Mechanics are turning to the South for employment in its promising and prosperous mills and factories and furnaces and machine shops. Farmers are being attracted by its fertile soils, its freedom from rigorous winters, the multiplicity of crops of which its lands are capable.

It is for these that "THE NEW SOUTH" is published, as well as for all others who desire information bearing on the resources and attractions of the Southern States. It is a book that should be read by every man in the South and by every one who has any idea of ever locating there.



## Notes From Dixie.

BY CHAS. H. WELLS.

An association of lumbermen from Georgia and Alabama has been formed, the object being "to concentrate the Atlanta and Western business into the hands of a general agent who alone shall name prices for the different markets in the hope of securing better prices." E. A. Brooks, of Banning, Ga., is president of the new association, and W. F. Amorous & Co., of Atlanta, are the general agents. Last year the city of Atlanta consumed about 45,000,000 feet of yellow pine and handled for Denver, Omaha, Chicago, St. Louis and other Western points, about 10,000,000 feet. There are in Georgia 400 mills that produce 5,000 feet each *per diem*—which would make the gross production of the State about 500,000,000 feet a year. This is only yellow pine of which I am speaking now.

The prices of yellow pine are way under those quoted in New York for an inferior lumber. "Mill run" pine is worth from \$8 to \$10 per M. at Atlanta and about \$12.50 per M. at the seaboard. One of the biggest lumber dealers in the South writes me: "Prices are very much depressed now, but the demand keeps pace with the supply—in fact, no mills keep stock; only saw on order, and to-day, in the whole 'yellow pine belt,' I am sure there is not in stock in aggregate, 5,000,000 feet of sawn lumber!" "There are," says the same writer, "many forests of oak, ash, gum, cypress and poplar, but there is very little attention paid to them, our business being almost entirely in yellow pine." The outlook for business next year is very encouraging. The introduction of yellow pine in the West opens new markets which will demand more than the present surplus now in the Eastern yards.

General Clingman, the discoverer of the new "tobacco cure," of which the medical papers have had so much to say lately, lives at Asheville. He is a very pleasant old gentleman and holds to the opinion that tobacco, applied in poultices, will cure almost everything from a black eye to a cancer. Some of the humorous papers have been poking fun at the General, but he relates some cures that are so wonderful as to be almost incredible. The remedy is so easily tried that its very simplicity recommends it to people of the poorer classes.

Visitors to Florida have found a new attraction—the mysterious smoke of Wakulla, near Tallahassee. History says it was first talked of when St. Mark's was just beginning to be known as a landing place for gulf-coast vessels. The sailors saw it from far out on the water; a tall, slender column, now black like pitch smoke, now gray like the smoke from burning leaves, and anon, pure white like steam. The darkeys call it "de debbil's tar-kiln." Its apparent location is in the midst of a swamp, very little above tide water, wherein grow every conceivable aquatic weed, grass, bush and tree—a jungle more difficult to penetrate than any in India or Africa. It is no hoax, no illusion, no creation of a fevered imagination—the smoke is there. It is a permanent mystery and it offers the reward of fame for high achievement to whomsoever will solve its riddle.

Captain White, of Greenville, S. C., advertises "the only second-class hotel" in the South. The captain is an inveterate joker and a wag of the most pronounced type. Some of his advertisements are worthy of a place in the humorous papers. Among the attractions claimed for the house are rooms

that are "cool, clean and calm." It is stated that "the house is located on a big pivot, and, as it revolves slowly 'round and 'round every apartment is, necessarily, a front corner room." The captain keeps a list of all the people he shakes hands with, and publishes the aggregate on New Year's day. His circular closes: "We are expected to make your stay pleasant; you are expected to make it profitable—to the proprietor."

It was my good fortune to meet Mr. Jere Baxter, of Nashville, vice-president of the Memphis & Charleston Railroad, the other day. "Speaking of the South," said he: "In much that has been written concerning this country, the effect has been rather to repel than invite capital, because it has been overdone. Description of the resources of our States does not need show-bill exaggerations or the florid language of a real estate bulletin. There are too many writers whose word-painting accomplishments exceed their capacity for the collection of solid statistics. Capital is shy of adjectives, but seems to have entire faith in Saxon monosyllables and confidence in those who employ them in presenting their prospectus." There is a good deal of sound sense in these frozen facts, and those who are preparing circulars and books for the benefit of capitalists would do well to take Mr. Baxter's hint. In the half dozen pamphlets, descriptive of Southern resources that I have picked up lately, I have found a dozen pages of "hifalutin" generalities to one page of statistical matter.

When speaking of Alabama, where most of Mr. Baxter's money is invested, he became very enthusiastic. "There are no barrens in the State," said Mr. Baxter, "and the agriculturist and the miner may find within this region those natural advantages which conspire to crown their labors with fruition. The State has this advantage, that whilst it grows the staples of cotton, rice, sugar and tobacco with profit, its climate and soil are equally adapted to every grain and fruit of the Northern clime, and its water power is so available and universally distributed that mills and factories may be established every few miles to monopolize every resource for the State's economical prosperity. Of the 32,000,000 acres of area in the State 20,000,000 are forests of yellow pine, black walnut, hickory, maple, cypress, locust, ash, poplar, and other valuable woods. Some of the land can be bought for \$2 an acre; some will realize \$100 per acre—according to location."

The recent burning of Palatka will deprive many Northern visitors of winter homes. Palatka was, at one time, the most beautiful place in Florida. It will be months before the hotels can be rebuilt, and it will doubtless be two or three years before the "city by the St. Johns" can hope to claim its former place among the chief resorts of the peninsular State. There were few finer hotels in the whole South than the "Larkin" and the "Putnam," both of which were totally destroyed by the fire. The hundreds of people who have gotten into the habit of spending the dreary month of March in the "Land of Flowers" will have to shift their quarters to Magnolia, or to some of the resorts farther down the river. Ocala and Gainesville have both been greatly benefitted by the Palatka disaster, so "it's an ill wind that blows nobody good." In Ocala for more than a year past, real estate has been on a boom, while in Marion county the price of hammock land has reached very fancy prices.

Floating around in the Southern papers is a paragraph, clipped from an Albany, N. Y., paper, stating that the new "Pullman buffet cars are a flat failure," and that "they will soon be discontinued by most of the railroads." Not long ago, while talking with Mr. Geo. M. Pullman, president of the Pull-

man Palace Car Company, I mentioned the new hard wood buffet cars now in use on the Piedmont Air Line. Mr. Pullman told me that these cars paid better than any style of cars operated, and that they were extremely popular in the South, where the railway eating houses are so abominable. I made the trip to Atlanta in December last, with the first buffet ever run over the Richmond and Danville system. It was the "Louvain," Capt. C. J. James in charge, and the sensation the novel car created was amusing. The various Southern railroads that run the buffets make them a feature of their advertising matter, and the Albany man's statement seems to smack of ignorance, to say the least.

Prof. William Earl Hidden, the discoverer of the famous Hiddenite gem in North Carolina, will have charge of the mineral exhibit of that State at the New Orleans Exposition. Prof. Hidden has already started for the Crescent City to make arrangements for presenting the display in a manner that will do credit to the tar heels. In addition to the Hiddenite, Prof. Hidden will exhibit a fine collection of rutiled quartz, topaz, emerald, ruby, garnet, spodumene, and other gem stones, all from Western North Carolina. There are, I think, but two pieces of the Hiddenite gem in the South at present, and these are in the shape of a pair of earrings owned by a young lady at Greenville, S. C. The demand for the stone in Europe is so great that Prof. Hidden sends them there as fast as they are mined.

There is a good opening for a flouring mill at Newton, N. C., and parties with capital (and experience in the business) could undoubtedly do well there. The surrounding country is noted as a wheat producing region, and the railroad facilities are excellent. The Chester and Lenoir Narrow Gauge and the Western North Carolina Railroad pass through the town. The freight rates are said to be arranged upon such an equitable basis that, with the prices of grain as they always are in Newton, the manufacturer at that point could successfully compete at Columbia or Charleston with Chicago dealers. At present the two principal cities of South Carolina buy nearly all their cereals and breadstuffs in Chicago, because there are not enough mills in the State to supply the market. This fact has especial significance, when we take into consideration the fact that in all the South there is no region equal to the Piedmont Belt as a cereal producing country.

The fact of the matter is, there is too much cotton raised in South Carolina and too little grain, and it cannot be long before the farmers realize this. The up-country is not the place for cotton growing, and each season leaves the farmer deeper in debt. The reason is as plain as day. The fertilizers necessary to force the growth of the cotton are so expensive that after they are paid for there is nothing left for the tiller of the soil. For instance: A dealer in phosphate pays from \$20 to \$24 a ton for his fertilizers. He retails it—on credit—and takes a due bill or mortgage on the prospective crop for 400 pounds of lint cotton for each ton of fertilizer sold. He buys in March and gets his money back in November, thus having his capital in use only nine months. Taking the average price of cotton at 9½ cents, the 400 pounds are worth \$37. It is therefore plain that an investment of \$20 or \$24 yields a return of \$37 in nine months. Figure out the percentage of profit for yourself, and then can you wonder that there is no money in cotton?

It is with sincere pleasure I chronicle the fact that the better class of North Carolinians express themselves as heartily disgusted

with the course of the Wilmington *Star* in attacking the prominent Southern industrial writer, Mr. Samuel Noble, the founder of the town of Anniston, Ala. The criticism of the *Star*, as published in the MANUFACTURERS' RECORD of November 29, is pronounced by some of the leading citizens of Raleigh, Greensboro, Salisbury, Asheville, and other flourishing towns to be perfectly just, and not a whit too severe. Thank goodness, the fire eating, blood and thunder class of people diminishes in numbers each year, as the New South marches on to prosperity, honor and glory.

### Copper Roofing.

Editor Baltimore Manufacturers' Record:

PHILADELPHIA, Nov. 29th, 1884.

Referring to the letter on copper roofing, published by you under our signature, in this week's issue, we desire to correct an error made by us, which was not discovered until too late to correct same. Our estimate of the cost of putting on 10 ounce copper under the patent referred to, was 15 cents per square foot over and above the cost of the material. This included the cost of tinning on both sides, namely 5 cents per square foot, or plain copper would cost 10 cents per square foot which would make it 31 cents, total cost for putting on 10 ounce copper, per square foot, instead of 36 cents, as stated by us. We have no doubt that many of your readers may consider that 10 cents per square foot, for putting on 10 ounce copper, exclusive of the cost of the material, is a high figure, but when it is taken into consideration that the sheets are to be locked, and the ends of the sheets are to be soldered, to make the length of the roll required, and that provision must also be made for fixing the sheets at frequent points, and securing same by bolts and nuts, which must be of copper, as iron would corrode the copper by galvanic action, the price named by us, we believe to be as near correct as possible as a sheet of copper laid 24 inches wide, loses four and a half inches in width, by the patent process referred to. We do not think it would be reasonable to expect 10 ounce copper put on in the usual manner of putting on tin roofing, to make a durable job. A standing seam would be rigid, and strong enough to drag the whole roof backward and forward by expansion and contraction, which would soon loosen the nails holding the cleats, and the roof would be liable under such circumstances to blow off. Upon further inquiry, we find that some of the buildings in Philadelphia, which are covered with copper, have lately been repaired by cutting away portions of the sheet copper, and using roofing tin instead.

Yours truly,  
MERCHANT & CO.

In the way of large tools, Wm. B. Bement & Son, of Philadelphia, are just now building a punching and shearing machine for the Keystone Bridge Co., which will punch a 4-inch hole in 1½-inch iron, 3 feet from the edge. The frame of the machine weighs 23 tons, the eccentric shafting being 13 inches in diameter. Shearing blades of different shapes and punches of different sizes can be used. The frame of the machine is 10 feet in height. The machine will make 16 cuts per minute. The firm are also building a punching machine for the Miltimore Car-Wheel Co., to punch the arm of their car-wheel out of flat bars of steel 1 inch thick. This machine will punch a 5-inch hole in 1-inch iron. The frame weighs 15 tons. Patterns are now also being made in the Bement shops for a lathe which will be capable of turning a shaft 53 feet long. The lathe is 70 feet in length, swings 60 inches, will be double-headed and triple-gear. Weight about 50 tons.

THE Webster, Camp & Lane Co., Akron, O., lately sold and put in a coal-haulage plant (tail-ropes system) for the Isabella Coke Works, at Cokeville, Pa., and has an order for another similar plant for the Columbus & Hocking Coal and Iron Company, of Columbus, O., for its mine No. 25 in Hocking Valley.—Industrial World.

# CONSTRUCTION DEPARTMENT.

**WE PUBLISH, every week, a list of every new factory, of whatever kind, projected anywhere in the South; every railroad undertaken, and every mining company organized. This information is always fresh, and, by enabling manufacturers to correspond with the projectors of such enterprises before their supplies of machinery have been purchased, is of great value. Manufacturers will find it to their interest to read this department carefully each week.**

## ALABAMA.

The Birmingham Agricultural Works, of Birmingham, Ala., previously reported, have secured a building for their factory and put in part of machinery.

The Euharlee Mills, Euharlee, Ala., are being rebuilt on an enlarged scale.

Eli Barrett, Euharlee, Ala., is building a large mill for Daniel Lowry.

Robert S. Brodhead and Evan R. Jones have purchased an interest in the DuBois Manufacturing Co., of Tuscaloosa, Ala., and will add a foundry and general machine shop for building engines, boilers, &c. Expect also to manufacture stoves and other hollow-ware.

F. A. Gamble, Jasper, Ala., will receive proposals till Jan. 6 for building a new county court house of stone.

Saffold Berney, Anniston, Ala., is working up a company to establish a furniture factory in that city.

W. P. Brewer, of Birmingham, Ala., is erecting his sash and door factory which will be 100x150 feet.

## ARKANSAS.

The Lincoln County Mills and Stock Farm Co., capital \$100,000, has been incorporated in Arkansas.

The Crystal Ice Co., of Little Rock, Ark., previously reported, have a capital of \$60,000. Will build ice factory immediately.

McCain & Sterritt, Pine Bluff, Ark., have received the contract for building the ice factory at that place, previously reported.

The Little Rock, Pine Bluff and White River Railway Co., previously reported, has been organized to build a road from Argenta, Ark., to Rob Roy. C. M. Neel, of Pine Bluff, Ark., is President.

## FLORIDA.

Chambers & Dunn, DeLand, Fla., will rebuild their large saw mill lately burned.

J. E. Hart, Jacksonville, Fla., whose hominy and meal mill is reported in this issue as burned, will probably rebuild.

Alex St. Clair-Abrams and others of Tallahassee, Fla., have ordered machinery for a large saw mill and will also double capacity of shingle mill lately erected.

Moomaw, Rouk & Co., of Aurora Ill., have purchased ground in the new town of Aurora, Fla., for a saw mill, and have commenced work on the building.

Webb & Higley, Higley, Fla., are increasing the capacity of their saw mill and box factory.

## GEORGIA.

It is reported that Scotch capitalists have invested \$200,000 in mining lands in White county, Ga.

A. R. Altmy & Co., Savannah, Ga., will erect a \$50,000 warehouse.

O. W. Bush, Chauncey, Ga., has commenced the erection of a factory for making lubricating oil.

C. G. Moore, Brunswick, Ga., is rebuilding his bracket works lately burned.

## KENTUCKY.

Joseph Dryer, Newport, Ky., is erecting a saw mill to cut marble.

Bennett H. Young, of Louisville, Ky., president of the Kentucky Union Railroad Co., is preparing to build this road and will extend it so as to open fine mineral property.

Scanlan & Co., Louisville, Ky., an incorporated company, manufacturers of mantels, stoves, &c., have increased their capital from \$40,000 to \$150,000.

The Kuttawa Flour Mill, Kuttawa, Ky., will be rebuilt.

Mr. Thomas Tynes and others will develop fire clay property near Greenup, Ky., and will probably build a \$20,000 railroad to furnish necessary transportation facilities.

## LOUISIANA.

The Southern Brush Electric Light & Power Co. are negotiating for the erection of electric light works in Algiers, La.

H. M. Barnhart and others, New Orleans, La., will erect a \$100,000 corrugated iron building.

The New Orleans Gas and Iron Co., capital \$1,000,000, is being organized in New Orleans to manufacture pig iron and gas. Frank A. Lee, 165 Common street, can give particulars.

A furniture manufacturing company is to be organized in Baton Rouge, La.

## MARYLAND.

The New Central Coal Co. will resume mining in their Big Vein mine near Lonaconing, Md.

John L. Cook & Co., of Havre de Grace, Md., are making extensive improvements to their flour mill.

The Baltimore & Ohio Railroad is surveying for a line of road to connect Baltimore and Annapolis by a shorter route than at present.

## MISSISSIPPI.

A cotton seed oil mill is being built at Rodney, Miss.

The Meridian Ice Company has been organized at Meridian, Miss., with capital of \$22,000, by John W. Fewell, J. S. Solomon, T. H. Miller and others, to manufacture ice, &c.

## NORTH CAROLINA.

The Wilmington & Weldon Railroad Co. will extend their road from Weldon, N. C., to Fayetteville, and thence to a point on the dividing line between North and South Carolina.

Considerable machinery has been purchased and is now being put in place for working the corundum mines of Dr. Lucas in Macon and Clay Counties, N. C.

Goldsboro, N. C., is figuring on water works.

L. S. Siceloff, Midway, N. C., will erect a saw mill near there.

## SOUTH CAROLINA.

W. B. Millwee, Greenwood, S. C., whose mill and gin were lately burned, will rebuild, and desires information as to latest improvements in the kind of machinery needed.

The Midland Railroad Co., of South Carolina, previously reported, has been organized to build a road from Greenville to Charleston, S. C.

## TENNESSEE.

The Richmond & Danville Railroad Co., will probably build a branch road so as to extend its line from Ducktown to Chattanooga, Tenn.

Wm. Rose, of Edmore, Mich., is in the South looking for a location for stove factory. May locate in Knoxville, Tenn.

A company is being organized in Chattanooga, Tenn., to establish a nail factory; capital is to be \$40,000.

## TEXAS.

The Tyler Water and Ice Co., of Tyler, Texas, has been organized, with a capital of \$50,000.

The Big Sandy Lumber Co. has been organized with a capital of \$15,000 to operate in Wood and Upshur counties, Texas.

G. M. Snodgrass, of Lampasas, Texas, contemplates building a street car railroad in Brenham, Texas.

Machinery has been ordered for a flour mill in Copetas Cove, Texas.

An ice factory will probably be erected in Corsicana, Texas.

## VIRGINIA.

The Dismal Swamp Canal Co., of Norfolk, Va., will expend about \$200,000 in enlarging their canal.

The Washington, Ohio & Western Railroad will be extended from Round Hill to Berryville, Va., a distance of 17 miles.

Benjamin Long, R. T. Armistead, and others, of Williamsburg, Va., will probably establish a peanut factory in that place.

The Abingdon & Laurel Railroad, and the Norfolk & Cape Henry Railroad are to be incorporated in Virginia.

The Mayor and City Council, of Charlottesville, Va., will contract for water works to cost not more than \$85,000.

Killian & Murray have leased iron ore property in Rockbridge county, Va., near Riverside station, on the Shenandoah Valley Railroad, and will develop it.

John Slough will establish a tannery at Collierstown, Va.

W. W. Jackson, Farmville, Va., has commenced working a coal mine.

Sult, Weiser & Co., Wytheville, Va., carriage manufacturers, will move into a larger factory.

It is reported that the project of building a cotton factory in Roanoke, Va., previously reported, and which has not been pushed for several months will now be carried out.

## WEST VIRGINIA.

Beltz Flading, Wheeling, W. Va., has commenced the erection of a planing mill.

## BURNED.

Mill and gin of Lafayette Willis, near Aberdeen, Miss.

Morrilton Furniture Factory, Morrilton, Ark. Loss \$25,000.

Mill and grain elevator of J. E. Hart, Jacksonville, Fla.

Mill of R. L. Turse near Martins, S. C.

Ice factory of Deware & Ward, Jefferson, Texas. Loss \$14,000.

McKnight's saw mill, Barnesville, Ga. Loss 2,000.

Mill and gin of Wm. Mays, Bradley, S. C. Loss \$1,200.

Turpentine distillery of A. H. Van Bokelen, Wilmington, N. C. Loss \$3,000 to \$4,000.

**"THE NEW SOUTH" is designed to meet a want that has now become imperative for some reliable and unbiased source of information as to different sections of the South.**

JUDGE Colt, of the United States Circuit Court of Massachusetts, recently granted the the Seibert Cylinder Oil Cup Co. of Boston a permanent injunction in their suit against Peter Barclay, for manufacturing and selling lubricators embodying the sight-feed patents owned and controlled by that company.—*Boston Journal.*

CASSELL & COMPANY, 739 & 741 Broadway, N. Y., may take praise to themselves for having issued the handsomest illustrated catalogue that has come from any American publishing house this or any other year. It is large quarto in size, thirty-two pages of extra fine calendered cut paper, with a blue paper cover, enlivened by a dainty border, a picture in itself. Nearly every page of the catalogue bears a handsome illustration, and some of them more than one, all beautifully printed. Every one who receives this catalogue, and it is sent on receipt of ten cents, will ask himself, "If the catalogue is so fine what must the books be?"

MESSRS. CASSELL & Co., New York, have just brought out the first issue of the American edition of *The Quiver*, an illustrated magazine for Sundays and general reading. This excellent magazine is already quite widely known in this country through its English edition, but it is with the view of giving it a wider introduction to American readers that the publishers have decided to issue it in this country also. It numbers among its contributors many of the leading writers of England. Subscription price \$1.50 a year.

THE Westinghouse Machine Co., of Pittsburgh, Pennsylvania, have been partially shut down for a month, in order to set new tools, enlarge their foundry, and build a new erecting shop and store room. They will start up again on or before December 1st, with a capacity of 100 engines per month. They report trade as steadily growing, notwithstanding the depression of the times and the distracting influences of the campaign. The business of the month of October was, in fact, the largest in their experience, their sales amounting to 75 engines. Their output for the month of September was 2,500 H. P., and the month of November promises to be still larger. They have recently made contracts with responsible parties, which insure the sale of the entire product of their works when increased to the capacity above noted, and work will be prosecuted vigorously throughout the winter.

WE call attention to the advertisement of Elsas, May & Co., of Atlanta, Ga., who have some rooms to rent in their great bag factory, with or without steam power. They are also proprietors of a large cotton factory. This is an unexampled opportunity for manufacturers who wish to locate South in the most growing city of that section. They can put their industries to work in quarters prepared with steam power.

THE MANUFACTURERS' RECORD, of Baltimore, Md., is one of the most enterprising trade journals which comes to our table. In the field of Southern news, of which it makes a specialty, it succeeds admirably, and appears to be at the same time in a most flourishing condition financially.—*St. Louis Store and Hardware Reporter.*

WOOD AND IRON, the representative industrial journal of the Northwest, published at Minneapolis, Minn., covers the manufacturing progress and enterprise in an important section of the country. It is published in a city where important business transactions of the Northwest culminate.

## LOCKWOOD, GREENE & CO.

## MILL ENGINEERS

Office, 65 Westminster St., Providence, R. I.

Carefully prepared plans, specifications and estimates furnished for the construction, equipment and organization of new mills and the revision and improvement of old.



### American Watch Making.

In the MANUFACTURERS' RECORD of November 15th was published an exceedingly interesting account of a visit to the works of the American Watch Company at Waltham, Mass., as detailed by a correspondent of the London *Times*, under the head of "Mechanical Appliances in America." We are further enabled this week to present to our readers a view of the works of this company, and illustrations of some of the most important departments.

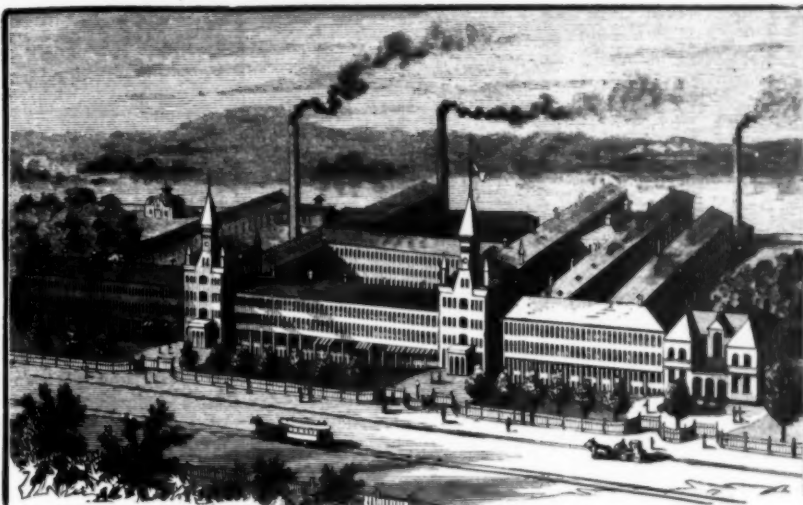
It is a part of the aim of the MANUFACTURERS' RECORD to bring to the attention of its readers the merits of American made goods, and their frequent superiority to the fancy high-priced imported articles, and with that end in view we publish the accompanying article. Thousands of watches are palmed off on the public which are inferior imitations made abroad and fitted into American cases. Every Waltham watch has engraved on its plate "Waltham, Mass.," and purchasers of watches should buy nothing without this trade-mark, which is patented in all civilized countries. The Waltham watches are sold by all jewelers, and no order from anybody not a jeweler will be filled at the works.

For most of the following description we are indebted to the Scientific American. It would be interesting if we could present a view of the small shop used in 1854, in contrast with the accompanying view of the magnificent structure built in 1878, and now occupied by the company.

A few figures will perhaps convey an idea of the magnitude of the Waltham Watch Works in their present form. The factory itself is a brick building, with numerous long wings, several towers, and inclosing three ample inner courts, besides an elegant suite of offices at one end and an observatory at the other. The total length of the front is over 700 feet. The floors cover nearly 5 acres. There are 3 1-6 miles of work benches, mostly made of cherry plank, 2 feet wide and 2 inches thick. There are 4,700 pulleys; 8,000 feet of wall rods; 10,600 feet of main shafting, and 39,000 feet of belting, varying in width from 2 inches to 2 feet. All this machinery is driven by a Corliss engine of 125 horse power. The number of hands employed has grown from 75 to 2,400.

When in 1857 the business, previously unsuccessful, was taken hold of by Royal E. Robbins, only 5,000 watches had been made in all since the starting of the factory in 1850.—Now over 2,500,000 have been made thus far at this one factory, of which 500,000 were made during the last 18 months! The present capacity of the works is 1,250 watches daily, which by recent improvements will soon be increased to 2,000. There have actually been sent out 30,000 in a single month, and 30,000 watches are needed all the time in the finishing rooms to enable the hands to work to advantage. According to Mr. Robbins' estimate, the value of a year's product of gold and silver watches in this country exceeds \$16,000,000; and the business directly and indirectly furnishes employment for 100,000 persons.

The factory at Waltham is located on an expansion of the Charles river, and is environed by parks maintained at the company's expense. The rooms are thoroughly ventilated, and all the sanitary arrangements are excellent; consequently the operatives are a remarkably healthy, cleanly and bright set of people—mostly young persons, whose unimpaired eyesight and steady nerves qualify them for the delicate work before them. Intelligence and integrity are also required in a business involving the handling of



VIEW OF THE WORKS AT WALTHAM, MASS.



BALANCE MAKING ROOM.

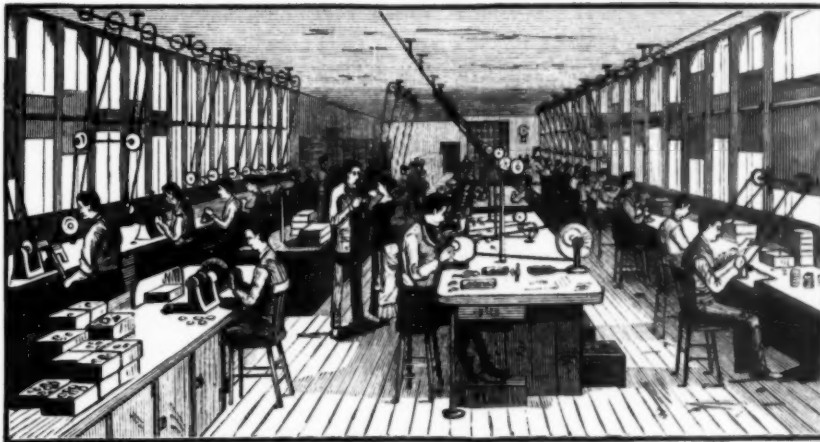
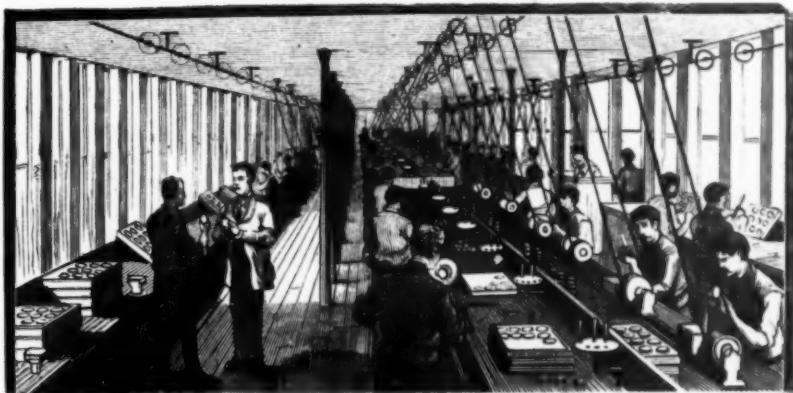


PLATE OR FRAME DEPARTMENT.



THE CASE MAKING DEPARTMENT.

quantities of precious metals and jewels. For certain kinds of work female operatives are preferred, on account of their greater delicacy and rapidity of manipulation; and it should be added that women get the same wages as men for doing the same kind and amount of work. All the apartments are lighted by large windows by daytime, and for night work there are 200 incandescent electric lamps and 3,500 gaslights, requiring over 22½ miles of piping. There are

38 furnaces using gas as fuel. Probably few persons realize how many distinct operations are required to produce a single watch. The managers themselves did not like to make a statement until by request the question was laid before the foremen: "How many distinct mechanical operations are required in order to construct one of the grade of watch movements described as an 18 size, full plate, stem-winder, jeweled 4 pairs?" Each foreman made a list of

the operations in his own department, and the startling sum total was 3,746; and the number would be considerably larger for some of the higher grades.

It is evident that the mere finish of a watch is no test of its excellence. The greatest pains are taken by the American Watch Company in perfecting the original model. Every variety of design and appliance that human ingenuity can devise is sought for; and a retinue of special artists, draughtsmen and inventors is continually busy to make each part and process as economical and accurate as possible. The various machines are thoroughly and exquisitely exact. They are all made in the extensive machine shops belonging to the company. A great hue and cry has been raised in Europe against machine-made watches, as if necessarily clumsy and defective; whereas the reverse is true. In the anxiety to secure a high finish, many a hand-made watch is polished to death. The aim of the American Watch Company is to secure actual interchangeability of pieces. It may be too much to say that the corresponding parts of all their watches are identically alike; but they will come within one ten-thousandth of an inch of it! *e. g.*, a jewel hole should be two ten-thousandths of an inch larger than the pivot that works in it. A few turns of the polisher would make a change. Hence microscopic measurement has to be resorted to in fitting pivots to jewels. But ordinarily, in assembling parts together, no measurement is necessary, but they are used exactly as they come from the machines. Furthermore, automatism in tools is the coming necessity for cheapening labor. The American Watch Company already uses many automatic and semi-automatic tools, and is constantly inventing more. The work thus secured is so nearly perfect that should any part of a watch fail in actual use the owner need only send on the number of the movement to enable the factory to supply an exact duplicate of the part. The order could be sent by postal card, and filled by return mail. To facilitate this a systematic record is kept; and this is so well done that any watch ordered could be located at any stage in its manufacture; and the same could be done for 1,000 or for 10,000 watches.

The "movement" of a watch is made up of two plates and the wheels, etc., between them. It may be as well, before going further, to refresh the reader's memory as to the general mechanism of a watch. The plates are known as the pillar plate and the top plate. On full plate watches the most peculiar thing is the barrel bridge, the object of which is to allow room for the main spring. A three-quarter plate is flush and the top plate not cut through, the main spring being narrower than in the former. All American watches have what is called a going barrel, instead of the fusee, preferred in the English system, though long discarded by the Swiss as superfluous. The going barrel contains the main spring, and drives the center wheel and pinion, which revolve once an hour, carrying the minute hand. The third wheel and pinion are simply intermediate between the center wheel and the fourth wheel, which carries on its staff the second hand, revolving once a minute. The fourth wheel also drives the escape wheel, so called because it only lets one tooth escape at a time, bringing the machine to a dead stop five times every second. They used to make all watches with 14,400 beats to the hour (or 4 to the second); this is called "slow train," and is now obsolete except for one-quarter second or "stop watches." The English standard was advanced to 16,200 beats to the hour (4½ to the second.) The Swiss and American standard is 18,000 beats to



the hour (5 to the second,) called "quick train." Experiments have also been made up to 21,600 beats to the hour (or 6 to the second,) called "fast train;" but results are not satisfactory. Experience has proved the "quick train" watches to be the best timekeepers.

The factory watches are all "lever escapement," universally accepted as best for pocket timepieces. The lever consists of a pallet and fork, and receives an oscillatory movement from the escape wheel. The balance, to which the lever imparts motion through the medium of the roller jewel passing alternately in and out of the fork, regulates the whole machine. It consists of a comparatively heavy wheel running on an axis with finely adjusted pivots, and with the least possible friction; and a hair spring attached at one end to the balance wheel and at the other to the balance cock, which is fastened to the top plate. The value of the hair spring is to determine the speed with which the balance wheel vibrates (*i. e.*, five beats a second.) The balance is bimetallic, to correct the contraction or expansion of the hair spring, so that the watch may run true regardless of temperature.

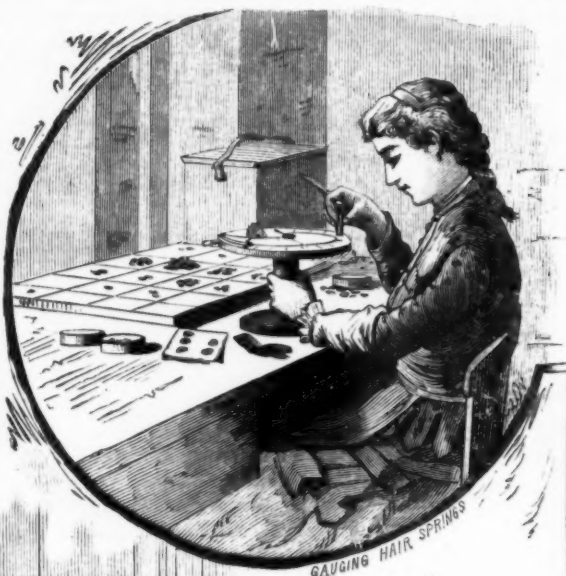
The minute and hour wheels are located under the dial, and are driven by a system of gearing. The cannon pinion fits friction tight on the center staff, being so put on to enable the hands to be set. The cannon pinion drives the minute wheel, and the minute pinion drives the hour wheel; the proportion being such that while the former revolves once an hour, the latter revolves once in twelve hours. Most of the watches now made are wound up by turning the stem of the case, and the hands are also set by a similar device, dispensing wholly with the watch key.

The safety of all this complicated movement from any injury that might result from the breaking of the main spring is secured by a safety-pinion screwing on to the arbor of the center wheel by a triple left hand thread. Should the mainspring break, the recoil would merely unscrew this pinion, and thus release the whole movement without any consequent damage.

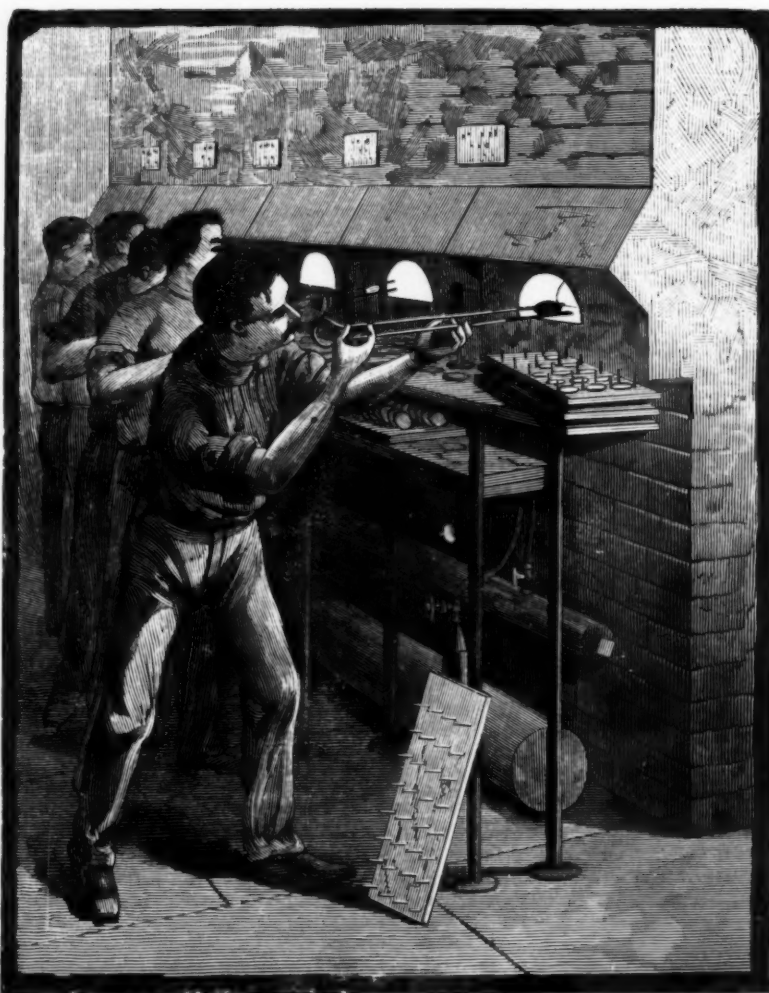
A volume would be needed to describe all the 3,746 operations required for the construction of an ordinary watch. But a general description of the main departments may meet the demands of the present article.

The *Plate Room* is where they manufacture the pillar and top plates. The material used is generally brass, although nickel is used for some of the more costly watches. Eighty operations are required for the pillar plate alone. These include facing off both sides; punching for dial feet, which are guides through all subsequent operations; turning for diameters; drilling, countersinking, burring, recessing, tapping, stoning, numbering, finishing both sides; putting in the pillars and turning and drilling them; making and inserting the click stud; cutting recesses for the lever arm, the barrel, and the various wheels; putting in the minute wheel pinion, and drilling and cupping the train holes. The pillar plates are then distributed in sets of ten trays, ten boxes to a tray, ready to receive the other parts. The top plate also goes through a like process, being punched, recessed, milled, pierced by screw holes, numbered, drilled, tapped, and stoned, potence put in, and the plates distributed. The parts being assembled and screwed together, several operations are performed, after which they are taken apart and finally distributed. During this process, at various times, the plates have to be boiled in soapsuds to clean them from dirt. The *barrel bridge* is also punched, trimmed, stamped thrice, milled, recessed and distributed. The *balance cock* is trimmed, flatted on emery wheels, turned to thickness, the star wheel regulator put on (an improvement on the arm regulator); it is stamped, burred, drilled, tapped, beveled, etc., and finally they are strung up by hundreds to be sent to the jewelry room.

The ratchet cap for the winding wheel is turned, drilled, recessed, etc., finished, and sent to the gilding room. Thus there are 157 operations in the plate room alone, as I made out my list going



JEWEL MAKING.



FIRING THE DIALS.

from bench to bench, only a portion of which are indicated above, but each requiring great care and precision.—My first intention was to go through each department with equal thoroughness; but the task would have taken a month, and the results would have required many explanations to make them generally intelligible to any but experts. Hence in describing remaining departments I shall give salient points instead of detailed processes. *The Press Room* is in charge of N. P. Mulloy. The first thing that was exhibited was a sort of cabinet, in whose glass jars and tiny drawers are myriads of parts of watches, each sort labeled, *e. g.*, regulators, yokes, forks, cam clicks, lever springs, winding wheels, train wheels, gold and steel balances, hour hands, minute hands, second hands, etc., everything in short that can be made by *punching*.

The effect is striking of seeing so many objects of a kind massed together, *e. g.*, 10,000 second hands in one jar—the result of one day's work in that line, the monthly order calling for 160,000. The counting is done by weight. A box of center wheels was weighed in my presence, and found to weigh 146 $\frac{3}{4}$  oz. A single ounce was then weighed, and the wheels counted and found to number 136. Consequently it was ascertained that there were 19,979 wheels in the box. Some idea of the multiplicity of operations in this department may be had on learning that there over 200 different sorts of hands now made! Many parts made here, and in other departments, are so small as to be almost microscopic, and measurements have to be made by a fine gauge micrometer. Curious to see the working of the instrument, I measured a single hair, finding it to be 5-1000 of a centimeter in diameter. Many operations have to be verified to within 1-2000 of a centimeter, *i. e.*, to 1-10 the thickness of a human hair!

Visitors always notice with interest the double row of iron tumblers whirling oddly in every way, used for brightening by attrition the steel works which are too minute to be polished by hand.

*The Pinion Room*, in care of Martin Thomas, who has been in the employ of the company 23 years, has another cabinet of jars, boxes and drawers, with pinions of every sort and in every stage. Probably as much is involved in perfecting the pinions as in any other department of watch making. Everything must be as exact as possible. The process begins with cutting the wires to be used in lengths of 18 inches. Then these are cut automatically to the right lengths, roughed out, and pointed. Five or six turnings follow, and then the leaves (or teeth) are cut. It has long been known that these should be epicycloidal in form; but under the old system it was difficult to effect this with desirable exactness. Drawings on a large scale could be made with mathematical precision; but it was another thing to reproduce them in almost microscopic miniature. And then, it is said, that many workmen had a singular prejudice to these peculiar teeth, fancying them to resemble bishop's miters! Here the superiority of machinery over handwork is visible. Machines have no prejudices nor æsthetic notions, and are as able to shape a little pinion exactly as the great wheels of the largest engine. The cutters and polishers of the machine for making the pinions are themselves kept true and in perfect order by a machine invented for giving the exact epicycloidal form. The final result is that, when all the parts of the watch are assembled and set in motion, the action is perfectly smooth and continuous, an end that can-



not be secured in any other way. This statement holds good for all grades of watches made here, the cheapest as well as the most costly.

After the leaves have been cut, the pinions are hardened and tempered, polished and finished and ready for use. Seven barrels of flour a month are consumed in making dough for various uses, besides many barrels of pith, and quantities of rouge and Vienna lime. At the time of my visit pinions for 100,000 watches were actually going through the works.

The Screw Department exhibits the perfection of automatic machinery more visibly than any other. The foreman, Mr. C. H. Mann, assured me that were it not for the necessity of hand finishing some of the finest work, there would not be needed more than a dozen workmen to make the daily average of 100,000 screws. There are twenty-four of these automatic machines, each making from 3,000 to 4,000 screws a day, not including night work. There is also an automatic pin machine that makes 20,000 pins a day for use in fastening hair springs. All these machines were invented and made here. The material used for screws is mostly the finest of Stubs steel; but some of them are made of brass and others of gold. Most of the wire is purchased of the proper size and supplied to the machines, which then make the screws, after which they are hardened and finished. The process for common work is to put several hundred screws on a block to be ground off on laps.

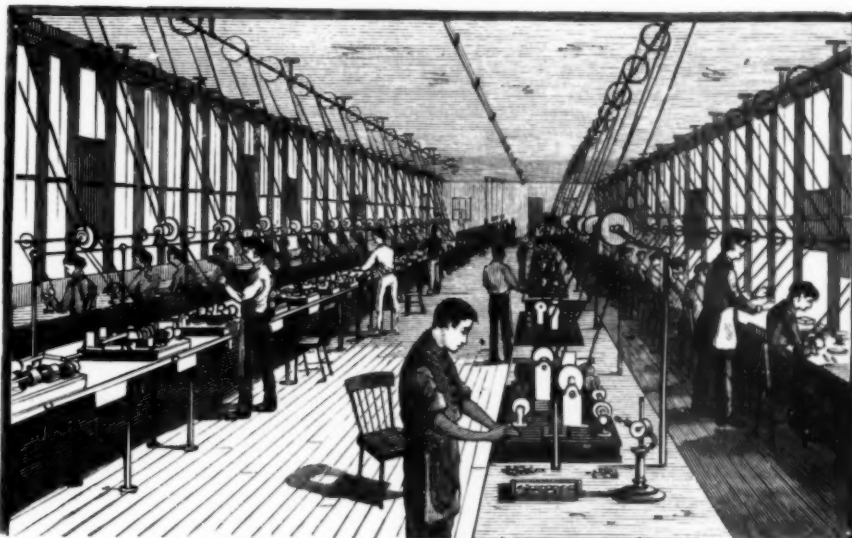
The finest qualities, however, have to be finished and blued singly, and all counted, because done by the piece. To illustrate the possibilities of this department, Mr. Robbins assured me that from steel wire costing the company but \$5.00 they could make 247,000 screws, weighing one pound, worth \$1,715.00. Most of the screws, of course, are of a larger size than this. It should be added that in this room is included the roughing out of work for various parts of the watch, e. g., the pinions, center staffs, etc.

**Gilding Room.**—All the brass movements have to be gilded, which is done under the direction of Mr. C. B. Hicks. The parts must first be stoned, then inspected, after which they are put through a bath of nitric, sulphuric, or muriatic acid. Having been rinsed, they are brushed with revolving wire brushes to prepare them for the gilding bath. Then they are rinsed in alcohol, dried in saw dust, inspected, and such as are ready for the finishers are folded in tissue paper and sent to their rooms. The gilding is done both with electric dynamos and with old style Daniell battery. From \$40 to \$50 worth of gold is put on the works of 1,000 watches in the process of gilding. An exhaust fan carries off all deleterious fumes, perfect ventilation is insured, and every precaution is taken against any poisonous effects from the various chemicals used.

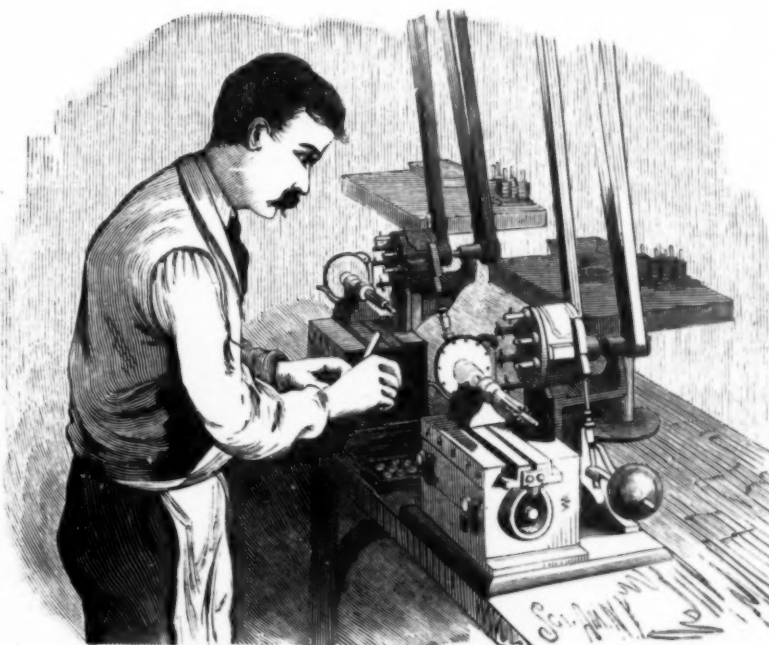
**Balance making** begins with a plain steel blank made of best steel. According to the foreman, J. L. Keyser, there are 85 operations in all required for making an expansion balance. The principal steps are as follows: First the center hole must be drilled, after which the disk is turned to a true diameter. It is then forced into a recess of a low brass capsule, and a ring of high brass is inserted between them. Having been prepared with a borax flux, it is heated sufficiently to melt the high brass on to the steel. It is then faced off to a definite thickness, turned, and rolled to condense the brass. The back is ground and the face recessed; after which the steel is punched, leaving the arm. Drilling, tapping, and finishing follow. Finally, the screws, 22 in number, are put in, being of



THE AMERICAN WATCH CO.—THE PINION ROOM.



SCREW MAKING ROOM—AMERICAN WATCH CO.



THE AMERICAN WATCH CO.—MAKING ESCAPEMENTS.



THE AMERICAN WATCH CO.—THE GILDING ROOM.

different sizes, weights, and metals to conform to the varying strength of the hair spring.

The Escapement includes the roller, roller jewel, pallet with its two jewels and arbor, fork and guard pin, screws, escape wheel and pinion—thirteen pieces in all—requiring the most exact precision. The mechanical principles involved are such as have been determined by repeated experiments, but cannot be easily explained without voluminous detail. This department is in charge of Mr. H. N. Fisher.

The escape wheel cutting is done by an automatic machine carrying six cutters, three steel and three sapphire. Fifty wheels are cut at a time, and it takes six cuts to make each

of the fifteen teeth. The machine stops when they are done. Each wheel is then set on its pinion and topped, to make sure it will run true in the round.

The garnet pallet stones are placed 30 or 40 together, on a steel block ground, and finished on one side, and then on the other. The edges are finished the same way. They are then stacked on a graduated plate, and marked with a diamond to be broken off to a length. They are then put in a grooved plate, set at the desired angle for the impulse force. All are finished with diamond dust on ivory laps. The polishing is done with an oscillatory motion, so as to give less bearing for the escape wheel. Jewel pins are shellacked into a spindle, in rectangular slips, turned with a diamond to remove corners, then ground with copper laps, and polished with shell laps charged

with diamond dust. One side is flattened for one-third its length, and then they are ready for setting.

Matching the escapement is done in the watch, which is regarded as preferable to the old method of doing it by the depthing tool.

The Jewel making department is under the direction of Wm. R. Wills. The first object exhibited was a cabinet containing agates and other materials for making polishing laps. Then a safe was opened containing about \$50,000 worth of precious stones. To some extent Brazilian diamonds are used for splinters to drill with. But for general purposes African diamonds are good enough. Diamond bortz, in the rough, costs \$1.50 a carat, or \$225 an ounce; and the company requires about 12,000 carats a year. It should be noted, however, that, contrary to the popular notion, no watch jewels are made of diamonds, because they could not be drilled. Glass also is never used, nor quartz crystal. The stones used are rubies, sapphires, garnets, and occasionally crysolite and aqua marine. A full jeweled watch takes 19 jewels, called, for the pieces to which they belong, balance, end stone, escape, pallet, third, fourth, and centre jewels. Every watch has the same grade throughout, e. g., one will have all garnets, another all rubies, etc.

The balance jewel, however, in all watches is either ruby or sapphire. There are 40 different grades of garnets; but the only sort used here is the hard violet from Bohemia and Germany. The process of making diamond dust is first by means of a crusher, and then a steel mortar held down by heavy weights. The result is a powder one-fifth diamond and four-fifths steel. After separation the dust is used in that state for diamond saws only; but, for polishing, it is graded by successive precipitation from olive oil. The jewels, having been sawed into thin slabs, are next rounded to size,



shaped, drilled, and faced. The jewel hole is opened to a certain size, varying from 0.005 to 0.020 of a centimeter, in order to fit the pivot—a process requiring the finest possible finish and polish, regardless of the quality of the stone. There were made, in the month of June, 350,000 jewels, employing 255 hands, of whom 175 were males.

The Hair Spring is a tiny thing, but has a department of its own under Mr. Thomas Gill. The material is steel wire 0.022 of a centimeter in diameter, and spun for this special use. It comes in coils, and the first thing done is to draw it through ruby and sapphire dies down to 0.018 of a centimeter. Next, it is rolled flat between hardened steel rollers, and afterward drawn between pairs of diamond dies, from which it comes out 0.027 of a centimeter wide and 0.908 thick. It is then cut into lengths of 14 inches, which are wound in little boxes, three in a box, these wired together in pairs, face to face, and hardened and tempered. They are then separated, cleaned by acid, and blued. The spring is now attached to a brass collet in the center, and to a steel stud at the outer extremity. Gauging the hair spring is a delicate operation. The gauge is a dial plate, 7 inches in diameter, beneath which is a spring of known strength attached to the center staff and jeweled. This dial is accurately divided into 2,000 divisions, each 0.01 of an inch wide. The hair spring is put on the end of the staff, where it is held by friction; the stud being attached to an arm held by an outer ring revolving about the dial, which is stationary. One revolution is made each way, and the strength of the hair spring determined by an index hand attached to the staff. It is seldom equally strong both ways, the variation amounting to from 5° to 10°; the average strength is about 1,000°. It takes so many degrees of strength in a hair spring to run a certain weight of balance and make the requisite number of beats per hour. All balance wheels are weighed; the average being 8 grains. One degree on the dial equals about 4 seconds of time an hour, and in the balance 0.01 of a grain makes the same difference. An exact record is kept of the weight of the balances, which goes with the work till it is completed. The last step is the actual timing and toning the hair springs in watches; after which they are laid away to be used according to their numbers. Each hair spring belongs to its own balance and each balance to its own watch, but they do not meet each other till the watch is done.

To show how greatly raw material can be enhanced in value by skill, it is worth mentioning that out of one pound (troy) of fine steel wire, worth from \$2.70 to \$5.40, may be made 17,280 hair springs, worth \$7.152 at lowest wholesale prices.

The Dial Making Room is under Mr. Charles Moore, who has been with the company since 1859. The dial has a copper foundation, which is pressed and pierced at one operation. Next, the dial feet are brazed in. Pulverized enamel is laid both on the back and the face, and then fused on, or "fired." Having been smoothed they are fired a second time, inspected, and sent to the painting room, of which E. L. Hull is foreman. Here the face is spaced into 12 equal divisions that are indicated by lead pencil marks. Two circles are drawn likewise, to mark the length of the letters or figures. Dabs of paint go on where the hours are to be; enamel paint being applied by a camel's hair brush. When dry, the tops and bottoms are cut off to the proper length, then by suitable tools straight spaces are cut through, leaving the heavy lines of the "hours," and the surplus paint is carefully scraped off. Painters then draw in the hair lines of the hours, and put on the name of the company. The "minuters" next, by the aid of an accurately graduated machine, paint on the minutes. After inspection the dials go back to the third firing. A circular cut is then made through the enamel on both sides, and the intervening copper is burned out with acid, thus making a hole for the seconds dial, which has been undergoing operations similar to what has been described. After the edges of the hole and of the "seconds bit" have been ground and polished, the bit is soldered to its place.

Time regulation is, of course, very important. Two superior clocks are kept for this purpose; one for mean time, and the other for a constant rate. The Watch Company want to keep as near to the standard time as possible; but for practical purposes the main thing is to fix a uniform rate for adjusting their watches. Hence they are not content with Harvard time, because they evidently think they can do a little better; Harvard running its excellent side real clock for mean time rather than for constancy in time keeping. The Waltham observatory has a transit instrument, and an astronomical clock electrically connected with all the rooms where the timing of watches is an object. A chronographic record is kept, and a daily record of errors and variations of temperature and barometrical pressure. The clocks them-

selves are kept in a dark room whose temperature is maintained at 70° Fahr. all the year round. The barometrical pressure is regulated by an air pump for the constant timer, which is kept in an air tight case.

ALDEN'S LITERARY REVOLUTION.—John B. Alden's *Literary Revolution*, though, possibly, not making so large a "noise" in the world as three or four years ago when its remarkable work was new to the public, is really making more substantial progress than ever before. A noticeable item is the improved quality of the books issued. Guizot's famous "History of France," not sold till recently for much less than \$50.00, is put forth in eight small octavo volumes, ranking with the handsomest ever issued from American printing presses, including the 426 full page original illustrations, and is sold for \$7.00. Rawlinson's celebrated "Seven Great Monarchies of the Ancient Eastern World," is produced in elegant form, with all the maps and illustrations, reduced in price from \$18.00 to \$2.75. These are but representative of an immense list of standard works, ranging in price from two cents to nearly \$20.00, which are set forth in a descriptive catalogue of 100 pages, and which is sent free to every applicant. It certainly is worth the cost of a postal card to the publisher, John B. Alden, 393 Pearl Street, New York.

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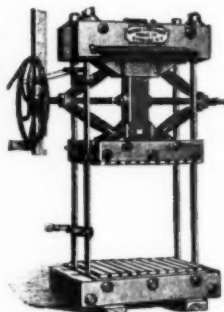
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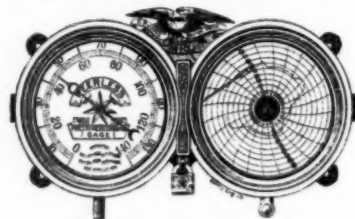
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BY COL. M. B. HILLYARD, NEW ORLEANS, LA.

Published by THE MANUFACTURERS' RECORD, Baltimore, Md.

## →PROSPECTUS.←

The publishers of the MANUFACTURERS' RECORD, in furtherance of their aim to lead in matters promotive of the material interests of the South, beg to state that they will shortly issue a work entitled **THE NEW SOUTH**, from the pen of COL. M. B. HILLYARD, of New Orleans, La. The book is devoted to an exposition of the South. It will treat of topography, soil, climate, woods, water-courses, resources, manufactures and such laws as are needful to be known. It will portray the attractions to the capitalist, and those seeking homes in the South, in the lines of manufacture, horticulture and agriculture. It will show what the South is and what she is likely to become by reason of her almost untouched, and slightly known resources in soil, climate, rainfall, marls, minerals and geographical position, and the vast variety of products possible to a wise and varied husbandry, and a grasp of her rich opportunities for manufacture.

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The book is entirely new in its scope and design, and aims to be a guide to all seeking information on most vital matters. No such book has ever been written; and it meets a want now imperative to those seeking information as to the South.

No one wishing to be informed about the South, either in this country or Europe, can dispense with this book.

The author is well-known both North and South for his long identification with Southern development, and perhaps no one else has contributed more to the general stock of information bearing on the South in the columns of Northern journals. His study of the South has been long, large and unremitting, and he contributes the ripe results of these years of study and personal inspection to the preparation of this book. His many qualifications pointed him out to the publishers as the one most fitted for a duty of such delicacy, magnitude and responsibility. They have, however, preferred not to rely upon their own convictions alone as to the author's fitness for the work. Below is furnished abundant testimony from eminent persons North and South, whose reputation, in some instances, is not limited to this continent, and who have witnessed the work of the author for years, in his attempts to invite attention to the South. These are replies to letters sent out by the publishers enquiring as to COL. HILLYARD'S fitness for this work.

The book will contain about 400 pages, and will be sold at a price but little in advance of the cost. It will be handsomely gotten up, and will be a model of typography. Its price will be, in paper covers 75 cents; in cloth, \$1.25. At these prices the sale of the book will not, of course, prove largely remunerative; nor was it with that object that it was undertaken. To the author the writing of it has been a "labor of love," and a furtherance of aspirations for Southern development. To the publishers it affords an opportunity to emphasize, and they hope, signalize, their enterprise, and to contribute a noteworthy indication of their resolve to press the claims of the South upon the capital and enterprise of the world.

The work is confidently commended for the novelty and amplitude of its design, for the breadth and accuracy of its information, for the laboriousness of its research, the many years of study and investigation there formulated, and its conscientious and impartial animus.

The following are letters corroborative of the wisdom of committing this work to COL. HILLYARD:—

FROM MAJOR S. A. JONAS, *Aberdeen, Miss., United States and State Commissioner from Mississippi to the World's Industrial and Cotton Centennial Exposition*:—"In answer to your favor of recent date I take pleasure in saying that I have known COL. M. B. HILLYARD for a number of years, and regard his selection as the editor and compiler of your book upon the South and its resources, as the wisest and best that could have been made. I do not in saying this pretend to gauge his literary capacity, but I know the man's wealth of information upon the subject you propose to confide to him, and where so much has been stored away in good and acceptable shape, it can hardly come forth any the worse for contact with its treasure house, especially in this instance, where the keeper is a man of character and culture, and withal an amiable and enterprising gentleman."

FROM PARKER EARLE, *Esq., President of the Mississippi Valley Horticultural Society, and Chief of the Horticultural Bureau of the World's Industrial and Cotton*

*Centennial Exposition*:—"Your engagement of COL. M. B. HILLYARD, of New Orleans, to write your proposed book, descriptive of the South and its varied resources, is a very fortunate one. I think there is no man in the country possessing so many qualifications for doing it accurately, ably and in a pleasing manner. I wish your enterprise great success."

FROM DANIEL DENNETT, *Esq., Agricultural Editor of the New Orleans Picayune*:—"I have just received your note. I have been acquainted with COL. HILLYARD for more than eight years. I know no man who has studied the interests of these States more intently than he, or with more ardent desire to benefit the South. He has acquired a vast amount of valuable information about the agricultural resources and mineral wealth of these States, and has the ability to put his information in readable shape. I consider him scrupulously honest, and his character above reproach. No man has shown more zeal or industry than he in efforts to promote the best interests of the Southern people. He is popular, and makes friends wherever he goes; and his friends are the best informed people in this country. He has a happy faculty for collecting such facts as you need for the book you intend to publish."

FROM JAMES H. HEVERIN, *Esq., The Eminent Philadelphia Lawyer*:—"I have known COL. M. B. HILLYARD all his lifetime; and I know no one, who from native talents, natural tastes, thorough education, long residence in the South, general experience, close observation, impartial judgment, and conscientious promptings, is more competent for the work you have confided to him. COL. HILLYARD has resided in a number of the Southern States, and during that time I have known, seen and heard much of him. He has been a close student, a careful observer and at all times an interested and enterprising citizen. He is thoroughly familiar with the States of the South, their governments, their people, customs, habits, products, industries, resources and histories, and is therefore fully and admirably equipped in every way for the charge with which you have entrusted him. It gives me great pleasure to commend him to those who may be interested in your contemplated publication."

FROM THOMAS MEEHAN, *Esq., The Celebrated Author, now Editor of The Gardeners' Monthly, Philadelphia*:—"I am very glad to know that you contemplate issuing a work on the industrial resources of the South."

I deem it fortunate that you have been able to secure the assistance of COL. HILLYARD in connection with it. I know of no man more able, while he has the advantage of thorough conscientiousness. I always found in my experience that if COL. HILLYARD said a certain thing was so, I might safely repeat it without danger of contradiction."

FROM COL. LEE CRANDALL, *Editor of The National View, Washington, D. C.*:—"I am very glad to know that you will soon publish a book on the Southern States."

You have made an admirable selection in COL. M. B. HILLYARD to write such a work. He is thoroughly acquainted with every section of the South, and will collect information invaluable to those desiring knowledge of any Southern State."

FROM J. G. KINGSBURY, *Esq., Editor of The Indiana Farmer, Indianapolis*:—"COL. M. B. HILLYARD has contributed to our columns, and he is a clear and interesting writer, careful and painstaking in collecting and reporting information regarding the condition and resources of the Southern States. He is eminently qualified for the work in which he is now engaged."

FROM GENERAL A. M. WEST, *Formerly President Mississippi Central R. R. Co., 2d Vice-President New Orleans, St. Louis and Chicago R. R. Co., President Mississippi Valley R. R. Co., etc.*:—"Your letter received, and contents noted. \* \* \* I congratulate you on the selection of MR. HILLYARD. No one more competent than himself could have been chosen."

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FROM S. H. EDGAR, *Esq., Manager New York Office, Louisville and Nashville Railroad, 52 Wall Street, New York*:—"In reply to your letter at hand a day or two since relative to the book you design publishing, descriptive of the Southern States, I beg to say that I consider COL. M. B. HILLYARD excellently well qualified for preparing the book in question. I have known him well for several years. He is a skilled writer; conversant especially with the physical characteristics of the Southern States; laborious and conscientious; and zealous in the work of making known the advantages the South possesses in climate, soil and general productiveness. You are happy in the selection of COL. HILLYARD to write your book."

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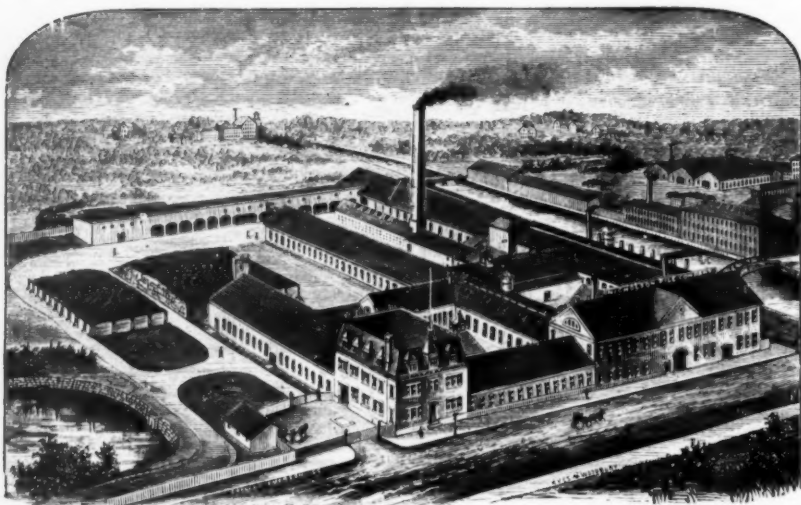
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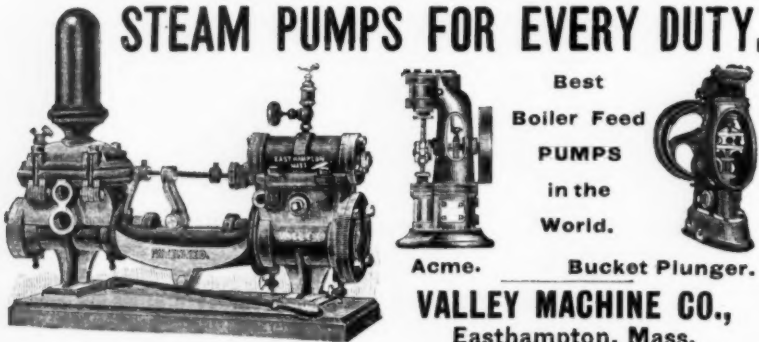
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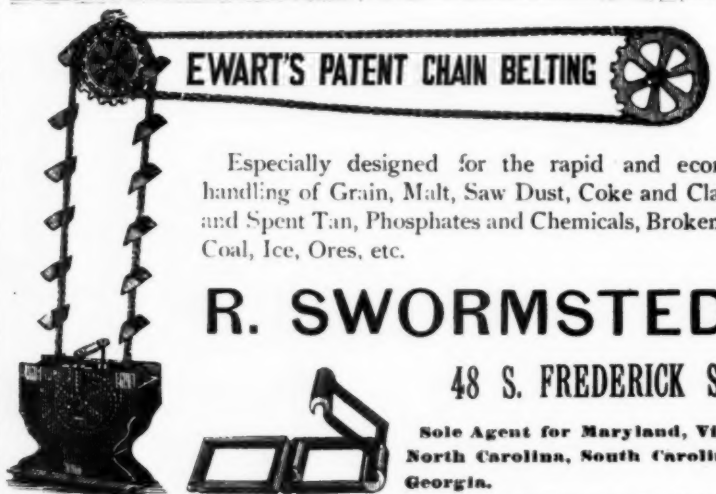
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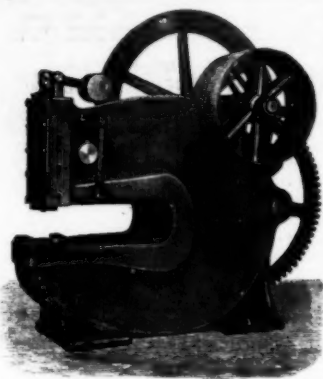
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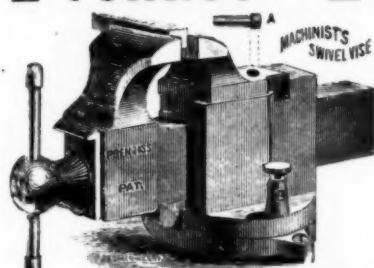
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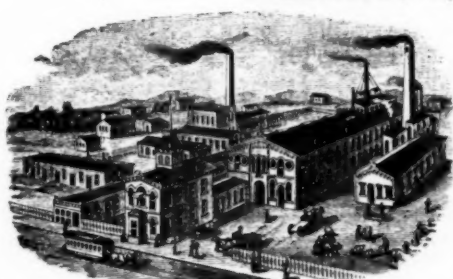
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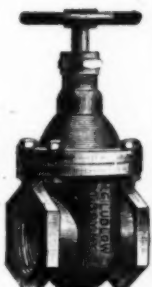
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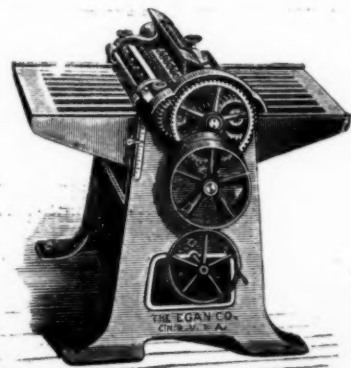


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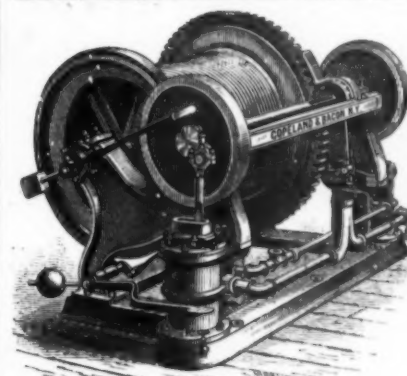


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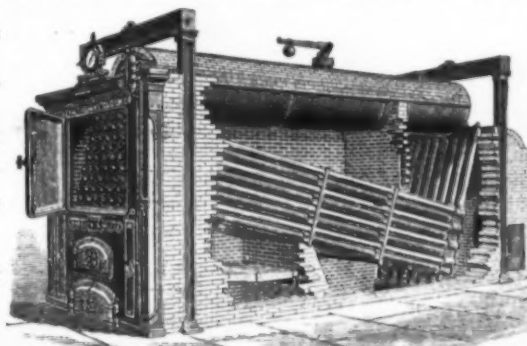
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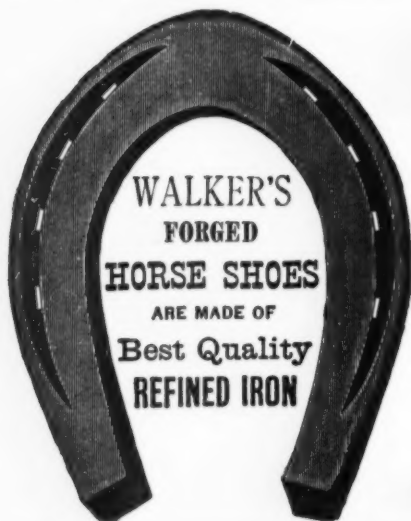
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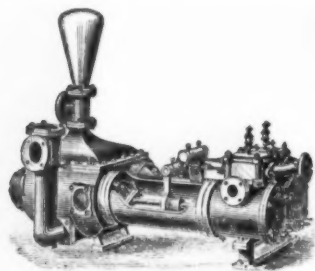
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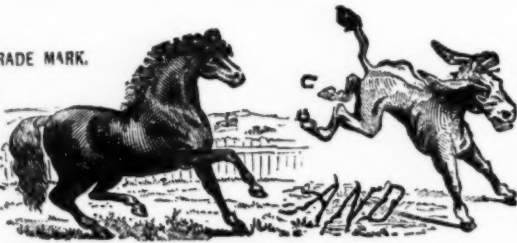
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Co's "Standard".....dis 40 5            Romer's.....dis 25 5            Conestoga.....dis 75 5            Scandinavian, "Norwich".....dis 50 10 5  <b>MALLETS.</b>            Penfield Block Co., Apple, Hickory and            Lignumvitae.....dis 30 5  <b>MEAT CUTTERS.</b>            Dixon's (P. S. &amp; W.) Nos. 1 2 3 4.....            Perry's.....            Woodruff's (P. S. &amp; W.).....            Hales'.....            Kieser's No. 55.....            Kieser's Gem.....            Kieser's No. 82.....            Kieser's Monarch.....            Beef Shaver, (Enterprise Manf. Co.).....  <b>MOLASSES GATES.</b>            Stebbins Patterns.....dis 70 10 5            Stebbins Genuine.....dis 67 5 10 5            Stebbins Tinned Ends.....dis 40 10 5            Chase's Hard Metal.....dis 50 10 5            Self-Measuring, (Enterprise).....dis 20 5            Lincoln's Pattern.....dis 60 10 5            Weed's.....dis 15 5            Boss Nos. 1 2 3 4.....            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Per 100 feet.....\$2.10 2.70 3.00 net.  <b>RIVETS.</b>            Iron and Tinned, new list, Dec. 10, 1881.....dis 40 5            In bulk, new list, Dec. 10, 1881.....dis 40 5            Copper Rivets and Burrs.....dis 45 5            No. 7 8 9 10 11 12 13 14 15            1/16, 4/16, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 1/2, 1 3/4, 2, 2 1/4, 2 1/2, 3, 3 1/2, 4, 4 1/2, 5, 5 1/2, 6, 6 1/2, 7, 7 1/2, 8, 8 1/2, 9, 9 1/2, 10, 10 1/2, 11, 11 1/2, 12, 12 1/2, 13, 13 1/2, 14, 14 1/2, 15, 15 1/2, 16, 16 1/2, 17, 17 1/2, 18, 18 1/2, 19, 19 1/2, 20, 20 1/2, 21, 21 1/2, 22, 22 1/2, 23, 23 1/2, 24, 24 1/2, 25, 25 1/2, 26, 26 1/2, 27, 27 1/2, 28, 28 1/2, 29, 29 1/2, 30, 30 1/2, 31, 31 1/2, 32, 32 1/2, 33, 33 1/2, 34, 34 1/2, 35, 35 1/2, 36, 36 1/2, 37, 37 1/2, 38, 38 1/2, 39, 39 1/2, 40, 40 1/2, 41, 41 1/2, 42, 42 1/2, 43, 43 1/2, 44, 44 1/2, 45, 45 1/2, 46, 46 1/2, 47, 47 1/2, 48, 48 1/2, 49, 49 1/2, 50, 50 1/2, 51, 51 1/2, 52, 52 1/2, 53, 53 1/2, 54, 54 1/2, 55, 55 1/2, 56, 56 1/2, 57, 57 1/2, 58, 58 1/2, 59, 59 1/2, 60, 60 1/2, 61, 61 1/2, 62, 62 1/2, 63, 63 1/2, 64, 64 1/2, 65, 65 1/2, 66, 66 1/2, 67, 67 1/2, 68, 68 1/2, 69, 69 1/2, 70, 70 1/2, 71, 71 1/2, 72, 72 1/2, 73, 73 1/2, 74, 74 1/2, 75, 75 1/2, 76, 76 1/2, 77, 77 1/2, 78, 78 1/2, 79, 79 1/2, 80, 80 1/2, 81, 81 1/2, 82, 82 1/2, 83, 83 1/2, 84, 84 1/2, 85, 85 1/2, 86, 86 1/2, 87, 87 1/2, 88, 88 1/2, 89, 89 1/2, 90, 90 1/2, 91, 91 1/2, 92, 92 1/2, 93, 93 1/2, 94, 94 1/2, 95, 95 1/2, 96, 96 1/2, 97, 97 1/2, 98, 98 1/2, 99, 99 1/2, 100, 100 1/2, 101, 101 1/2, 102, 102 1/2, 103, 103 1/2, 104, 104 1/2, 105, 105 1/2, 106, 106 1/2, 107, 107 1/2, 108, 108 1/2, 109, 109 1/2, 110, 110 1/2, 111, 111 1/2, 112, 112 1/2, 113, 113 1/2, 114, 114 1/2, 115, 115 1/2, 116, 116 1/2, 117, 117 1/2, 118, 118 1/2, 119, 119 1/2, 120, 120 1/2, 121, 121 1/2, 122, 122 1/2, 123, 123 1/2, 124, 124 1/2, 125, 125 1/2, 126, 126 1/2, 127, 127 1/2, 128, 128 1/2, 129, 129 1/2, 130, 130 1/2, 131, 131 1/2, 132, 132 1/2, 133, 133 1/2, 134, 134 1/2, 135, 135 1/2, 136, 136 1/2, 137, 137 1/2, 138, 138 1/2, 139, 139 1/2, 140, 140 1/2, 141, 141 1/2, 142, 142 1/2, 143, 143 1/2, 144, 144 1/2, 145, 145 1/2, 146, 146 1/2, 147, 147 1/2, 148, 148 1/2, 149, 149 1/2, 150, 150 1/2, 151, 151 1/2, 152, 152 1/2, 153, 153 1/2, 154, 154 1/2, 155, 155 1/2, 156, 156 1/2, 157, 157 1/2, 158, 158 1/2, 159, 159 1/2, 160, 160 1/2, 161, 161 1/2, 162, 162 1/2, 163, 163 1/2, 164, 164 1/2, 165, 165 1/2, 166, 166 1/2, 167, 167 1/2, 168, 168 1/2, 169, 169 1/2, 170, </p>
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OFFICE MANUFACTURERS' RECORD, )  
BALTIMORE, Dec. 3, 1884. )

Baltimore Charcoal Wheel Iron (all Baltimore ore).....	\$28	00@29	00
Virginia C. B. Charcoal Wheel Iron.....	28	00@	—
Anthracite, No. 1.....	21	00@23	00
“ “ 2.....	20	00@21	00
“ “ 3.....	18	00@20	00
“ Mottled and White.....	16	00@17	00

PHILADELPHIA, Dec. 2d, 1884.

In steel rails there is a fair amount of business doing, mostly in small lots, at about \$28; fair sized lots will be sold at \$27.50 and large orders at \$27; light sections are selling all the way from \$30 to \$38, according to

CINCINNATI, Dec. 1, 1884.

### HOT-BLAST FOUNDRY.

Hanging Rock,	No. 1.....	\$21 00	@22 00
“	No. 2.....	19 00	@20 00
Tennessee and Alabama,	No. 1.....	19 00	@20 00
“	No. 2.....	18 00	@18 50
<b>FORGE.</b>			
Strong Neutral Coke.....	\$15 00	@15 50	
Mottled .....	13 00	@13 50	
Cold Short.....	14 00	@15 00	
<b>CAR WHEEL AND MALLEABLE.</b>			
Southern Car-Wheel Iron.....	22 00	@25 00	
Hanging Rock C. B.....	25 00	@27 00	
“ W. B.....	20 00	@23 00	
Lake Superior Malleable.....	23 00	@24 00	

Specially reported by E. L. HARPER & CO.

CINCINNATI, Dec. 1, 1884.

The business of the week has been moderate, and the market is void of any special feature of interest or promise. Orders are in the main confined to present necessities. We quote as prices current f. o. b. cars Cincinnati, O.:

	FOUNDRY.	Cash,
Hanging Rock Charcoal, No. 1.....	\$21 00@22 00	
" " " " 2.....	20 00@21 00	
Strong Neutral Coke, " 1.....	17 00@18 00	
" " " " 2.....	16 00@16 50	
American Scotch, " 1.....	17 00@17 30	

GREY FORGE.

Neutral Coke.....	14	50@15 00
Cold Short.....	14	50@15 00

CAR WHEEL AND MALLEABLE.

Hanging Rock, strictly cold blast.....	25	50¢@26	00
“ “ “ warm “ .....	22	00¢@22	50
Lake Superior Charcoal, all grades.....	22	00¢@23	00
South. Car Wheel, strictly cold blast.....	22	00¢@23	00
Amherst and Virginia Warm Blast.....	21	00¢@21	50

Specially reported by W. B. BELKNAP & Co., Nails,  
Wire, Iron, Hardware, Carriage and Wagon  
Goods.

LOUISVILLE, KY., December 1, 1884.

We learn that for spring goods, hoes, forks, etc., good orders are being taken by the representatives of the leading concerns, which indicates to a degree at least restoration of confidence.

Specialty reported by GEO. H. HULL & Co., Commission Merchants for the sale of Hot and Cold Blast Pig Iron.

LOUISVILLE, KY., Dec. 1, 1884.

The market is quiet and sales light, with some slight improvement in inquiries. We quote for cash in round lots as below :

FIG IRON,  
Southern Coke, No. 1 Foundry.....\$17 50@ — —

Hanging Rock Coke, No. 1 Foundry.....	16	50	50
" " " Charcl.....	17	50	50
Southern Charcoal, No. 1 Foundry.....	18	00	49
Silver Gray, different grades.....	15	00	17
Southern Coke, No. 1 Mill, Neutral....	14	75	15
" " " " " Cold Short.....	13	75	14
Southern Charcoal, No. 1 Mill.....	16	50	17
White and Northern, different grades.....	12	00	10
Southern Car Wheel, standard brands.....	20	00	20
" " " other brands.....	21	00	20
Hanging Rock Cold Blast.....	25	00	26
" " Warm.....	21	00	22

Specially reported by S. B. Lowe.

CHATTANOOGA, TENN., Dec. 1, 1884.

The past week has shown but little animation or revival in the iron business. There has been the usual demand from Southern foundries for car-load lots, which range from \$15.50 to \$16.00 for No. 1 and \$14.50 to \$15 for No. 2. There has been considerable demand for Silvery and American Scotch, which brings readily \$14 to \$15, according to grade and furnace; these prices are for two days, or 2 per cent. off if cash.

Nails are dull at \$2.10. The steel nail appears to be rapidly making its way among our merchants, who so far have not been able to supply themselves with sufficient to meet the demand. Little is doing in bar iron; the rate remains the same—\$1.70 for wholesale lots. Old rail, old wheels, in fact scrap of all kinds are only nominal, as the views of buyers and sellers are wide apart. There has been considerable demand for railroad fastenings, to fit out the new steel rails that are being laid to replace the iron. Spikes are \$2.25; bolts \$2.75; and plate \$1.70. The barbed wire factory continues to run full, and selling at 15 1/2 cts. for wholesale lots.

Beach, S. J., and S. A., Norfolk, Va. Combined folding chair and bath tub.....	308,456
Brown, Perry, Louisville, Ky. Car coupling.....	308,404
Callahan, J. F., Knoxville, Tenn. Mill stone driver.....	308,464
Collins, Eli, Little Rock, Ark. Spectacle frame.....	308,344
Evans, Geo. W., Baltimore, Md. Seal and railway ticket for milk cans.....	308,478
Fountain, Hugh T., Burnt Corn, Ala. Harrows.....	308,485
Goodman, John and H. M., Louisville, Ky. Electricity gauge.....	308,487
Gregg, T. E., Mineral Spring, S. C. Cultivator.....	308,490
Johnson, W. O., Kaufman, Tex. Adjustable book support.....	308,499
Jones, J. A., Tyler, Tex. Spark arrester.....	308,505
Jordan, W. A., New Orleans, La. Nut washer.....	308,506
Kersten, Max, Shepherdsville, Ky. Bridge.....	308,501
Lindley, L. W., Danville, Ky. Wire fence.....	308,505
Oldershaw, J. B., Baltimore, Md. Hot air furnace.....	308,428
Poe, Samuel T., Covington, Ky. Shingling gauge.....	308,574
Pyles, Newton E., Coronado, S. C. Blotter.....	308,378
Reid, J. A., Belling, Ala. Car coupling.....	308,380
Schindler, Antor, Weimar, Tex. Plow.....	308,383
Shannon, T. B., Huntsville, Tex. Combined seed planter and cultivator.....	308,437
Warmoth, M. M., Brandenburg, Ky. Plow.....	308,539
Wicks, W. A., Baltimore, Md. Apparatus for preserving fruits, &c.....	308,393
Young, F. R., Thomasville, Ga. Pea and bean sheller.....	308,580
Young, Jr., R. J., Norfolk, Va. Fertilizer.....	308,392

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in their Great Bag Factory Building on Pryor street,  
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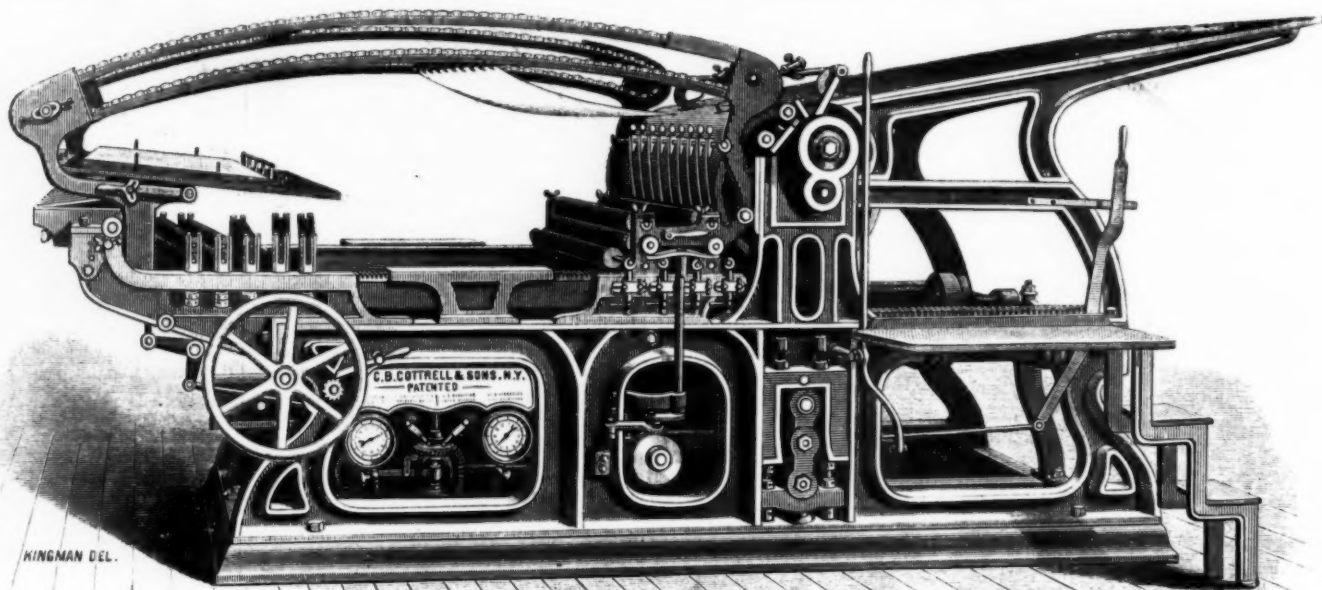
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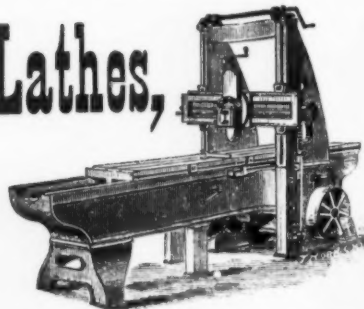
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Established 1867.

### E. HARRINGTON, SON & CO.

MANUFACTURERS OF

## Lathes,

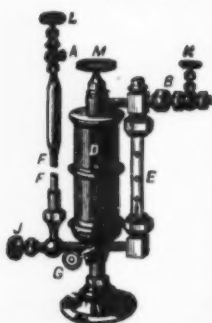


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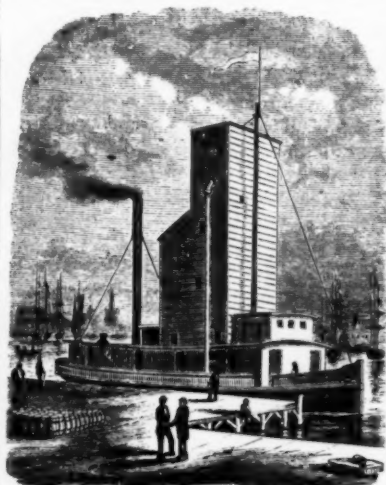
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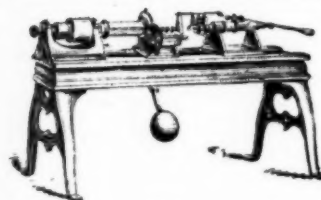
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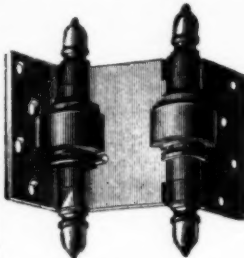
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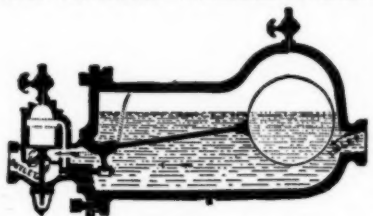
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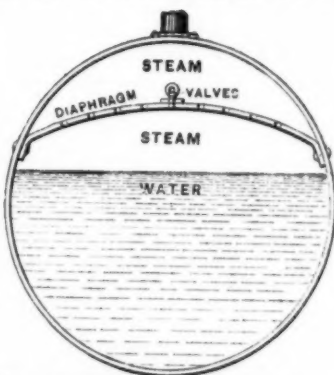
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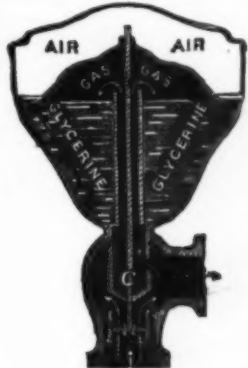
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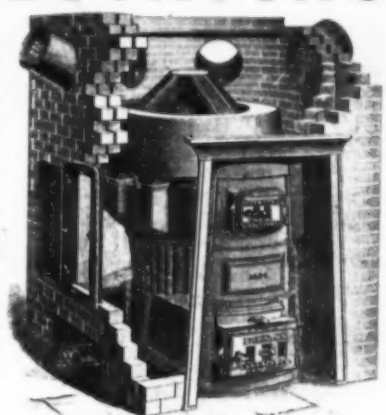
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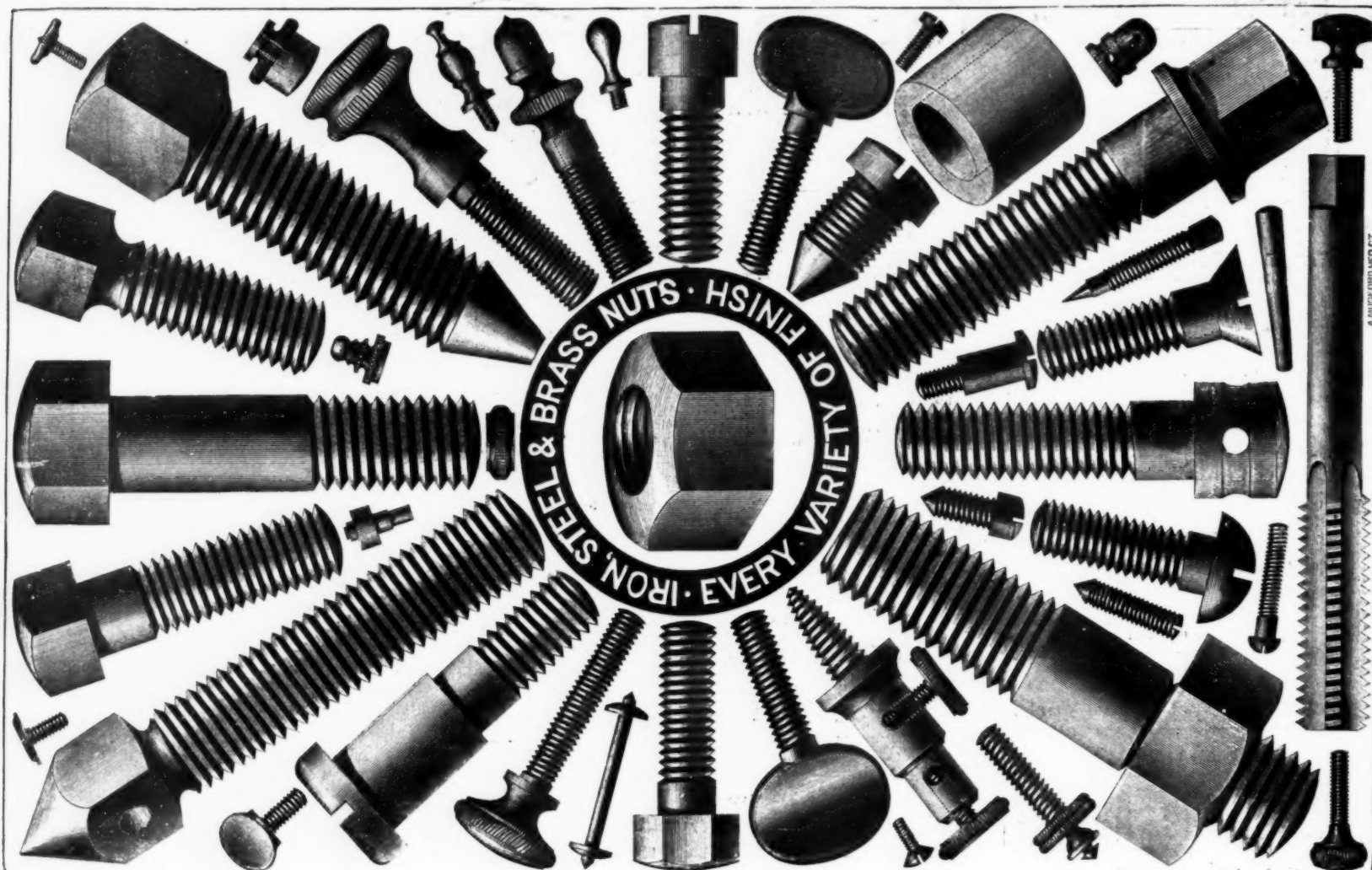
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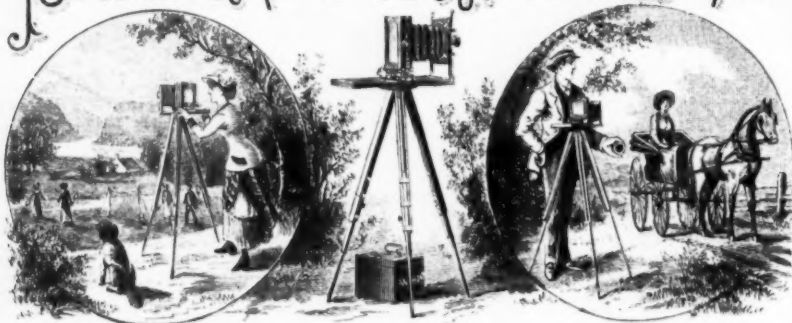
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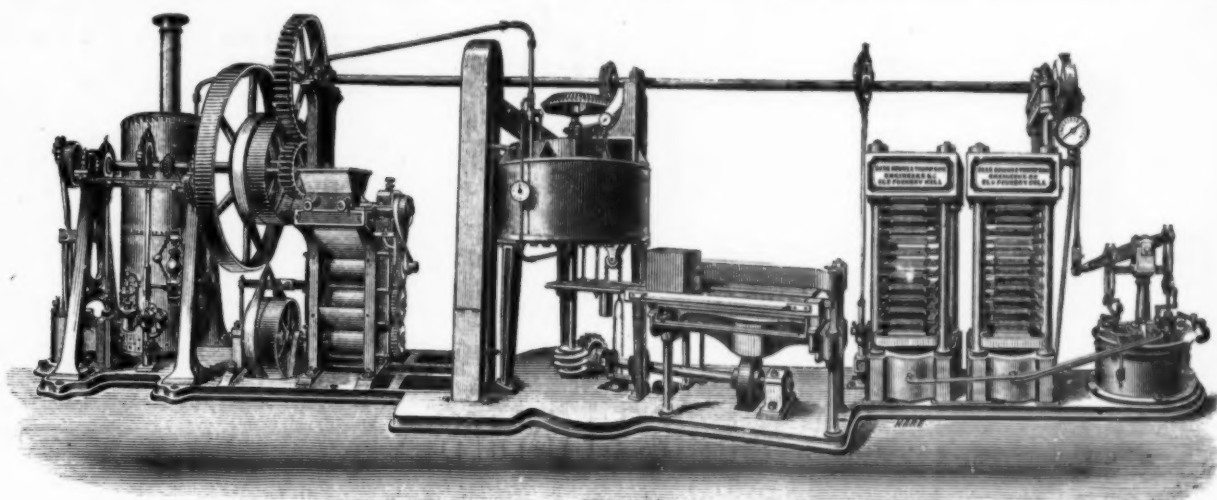
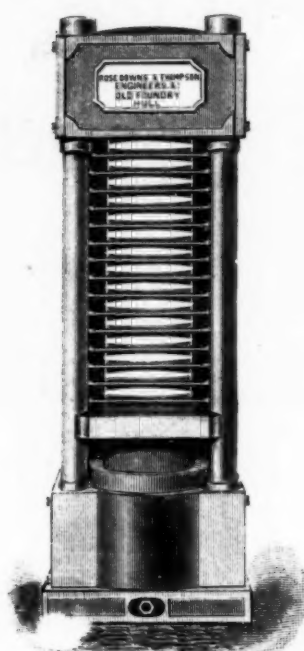
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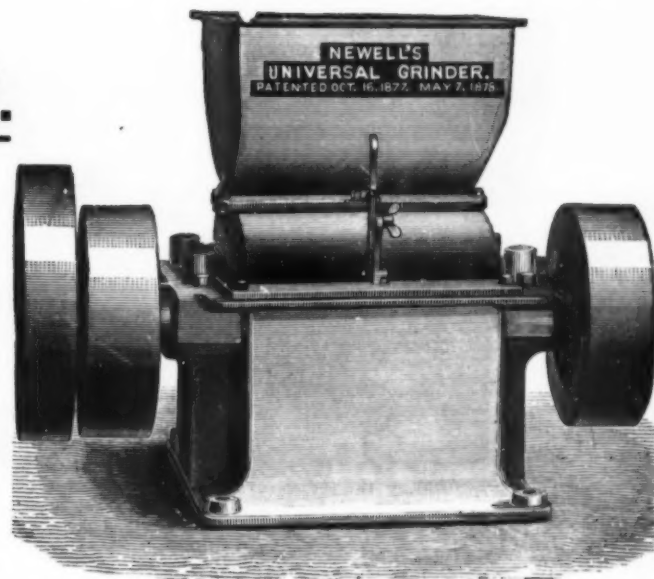
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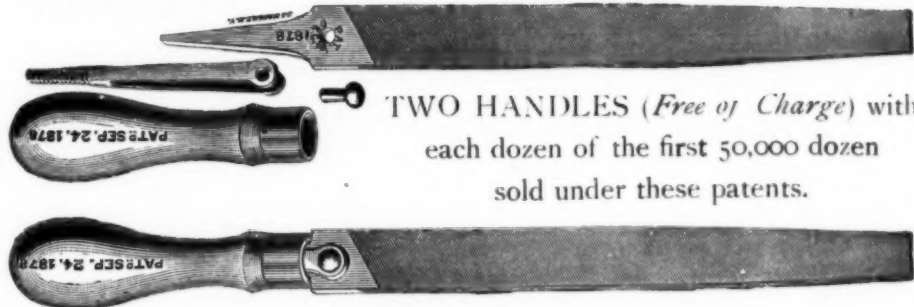
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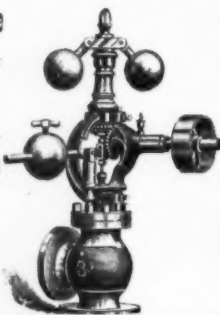
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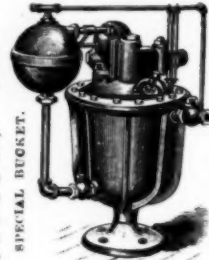
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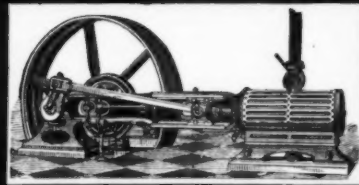
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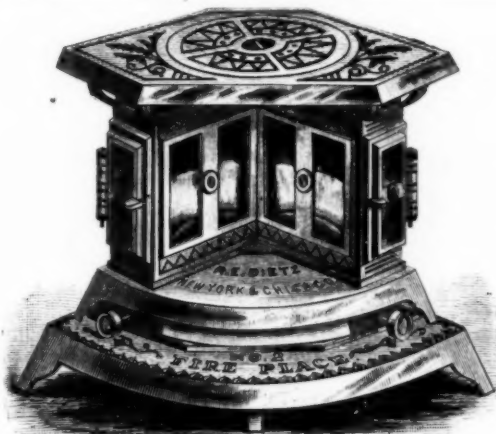
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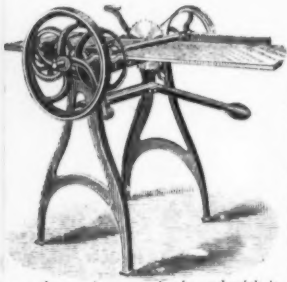
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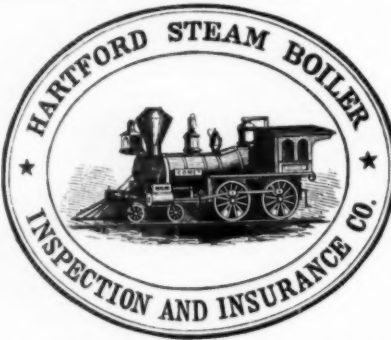
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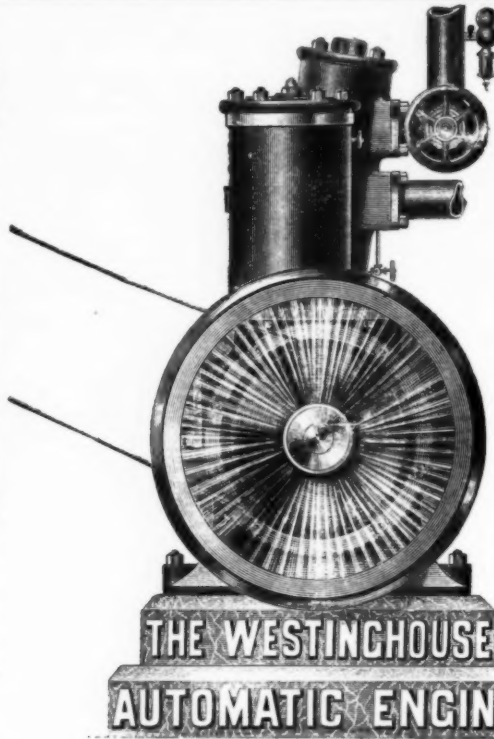
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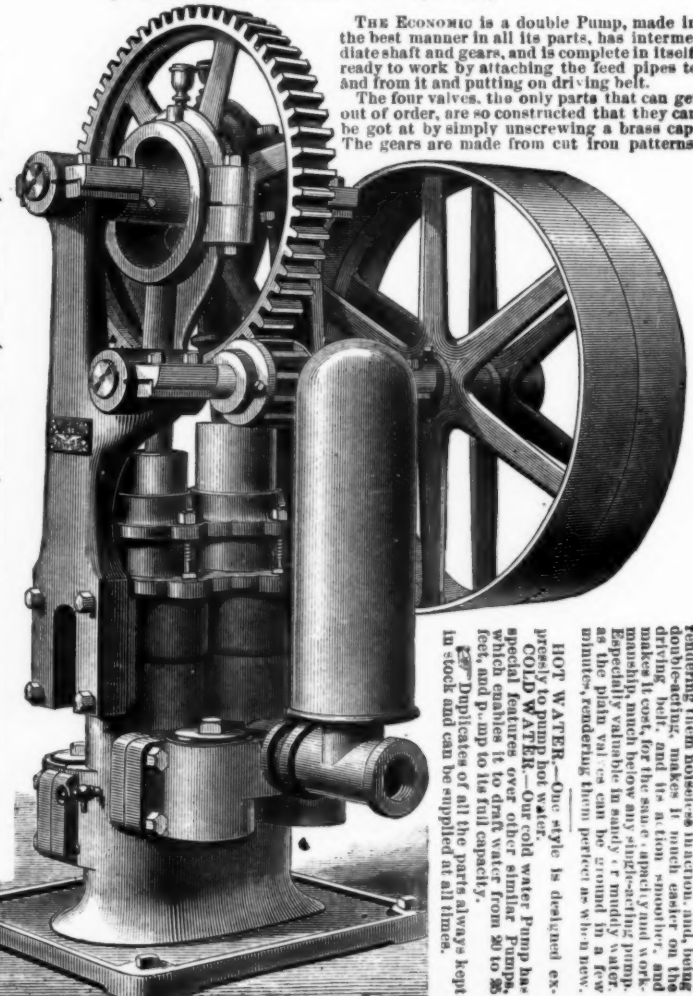
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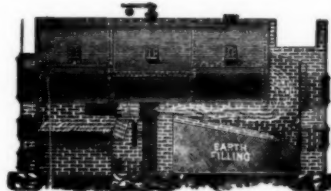
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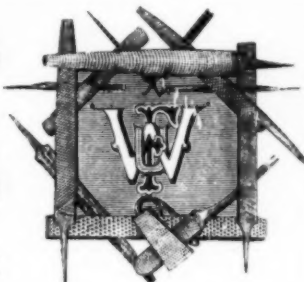
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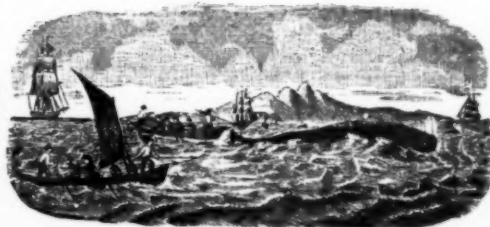
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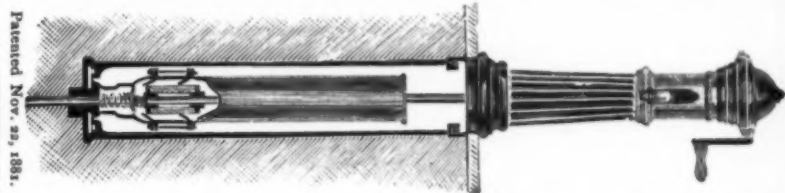
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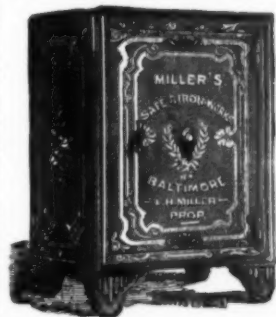
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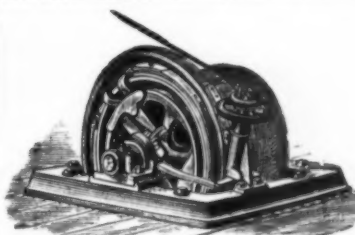
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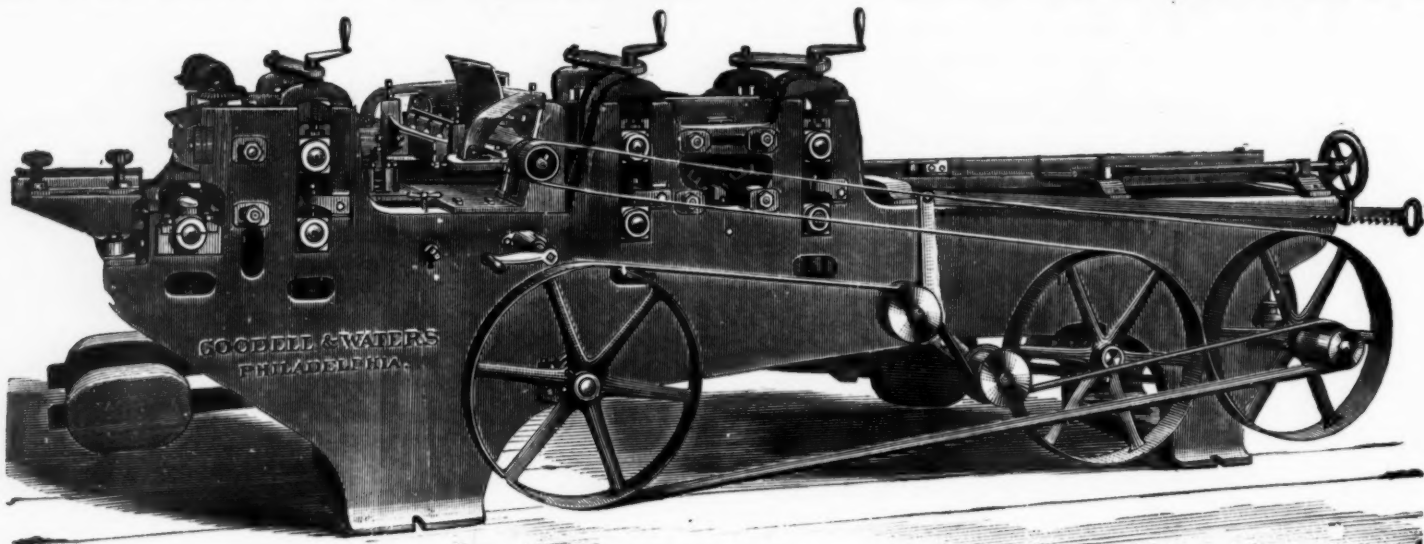
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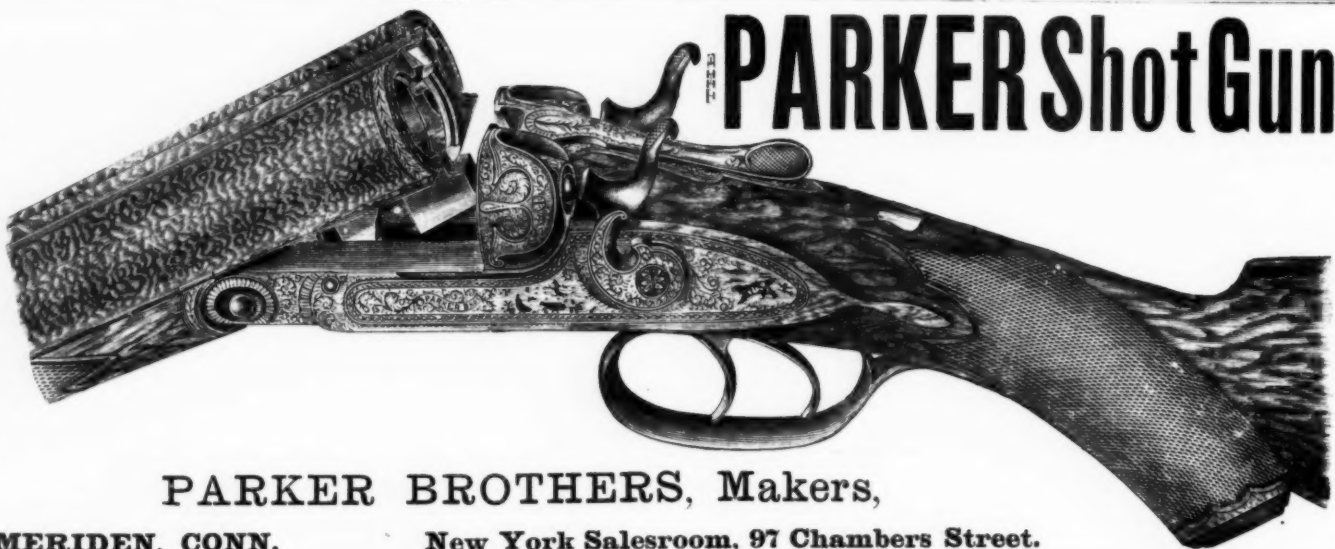
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# National Tube Works Comp'y

BOSTON :

NEW YORK :

CHICAGO :

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8 PEMBERTON SQUARE.

104 JOHN STREET.

CLINTON and FULTON STS.

802 N. 2d STREET.

MANUFACTURERS OF

Lap-Welded

WROUGHT IRON PIPE

1/4 inch to 16 inches diameter.

Oil Well Tubing and Casing.

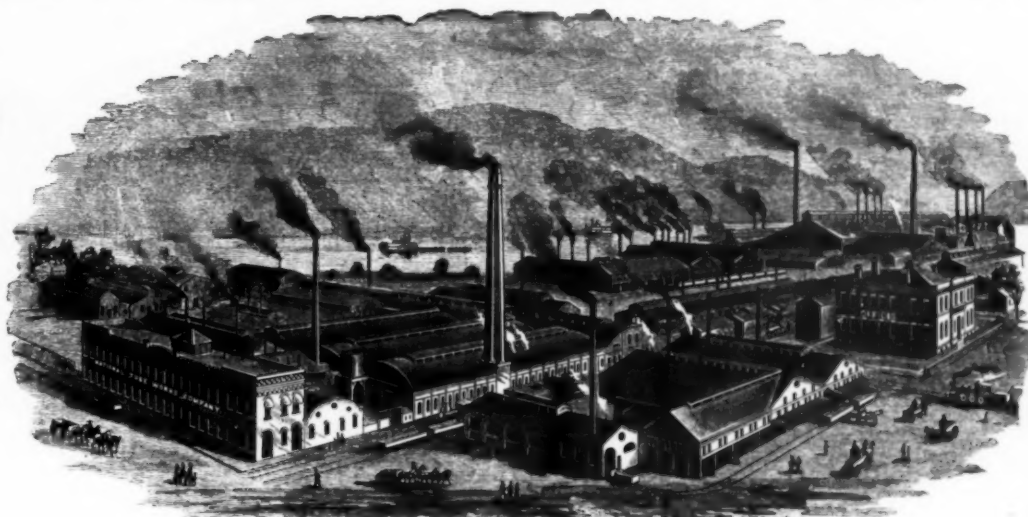
Indestructible Pipe

—FOR—

Mines and Salt Wells.

Steam and

Gas Pipe.



[WORKS AT M'KEESPORT, PENNA.]

STANDARD

Lap-Welded

Boiler Tubes.

SEMI-STEEL TUBES

—FOR—

LOCOMOTIVES.

Kalamein Tubes

WHICH WILL NOT RUST.

Mack's Injector

the best thing to Feed Boilers with  
HOT WATER.

## Patent Water Pipe with Patent Converse Joints

— LIGHT, STRONG AND INDESTRUCTIBLE. —

A VAST IMPROVEMENT ON CAST IRON PIPE.



SILVER MEDAL AWARDED AT THE "NATIONAL EXPOSITION OF RAILWAY APPLIANCES," CHICAGO, JUNE, 1884.

GANDY'S \* PATENT

— AWARDED MEDALS AT —

Berlin.....1879.  
Hamburg.....1879.  
Sydney.....1879.New Zealand.....1882.  
Cincinnati.....1879.  
New York.....1880.

MACHINE \* BELTING

Made Perfectly Straight and any Length without Joints.

For Main Driving it is the Best.

— Much Cheaper than Leather.

— MANUFACTURED BY —

THE GANDY BELTING CO.

BALTIMORE, MD.

## Union Stone Comp'y

Nos. 38 and 40 Hawley Street, Boston, Mass.

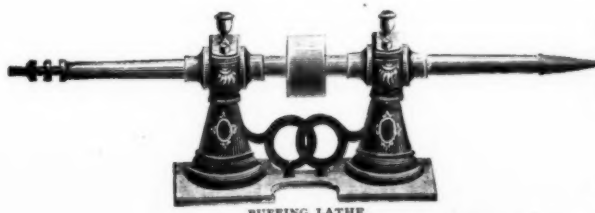
— PATENTERS AND MANUFACTURERS OF THE —

UNION EMORY WHEEL.

Emery Wheel Machinery and Tools a Specialty.

Automatic Knife-Grinding Machines, Wood-Polishing Wheels, Corundum, Grinders' and Polishers' Supplies,  
Catalogue on Application.

JACKSON &amp; TYLER, Agents, 16 and 18 S. Howard Street, BALTIMORE, MD.

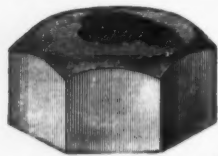
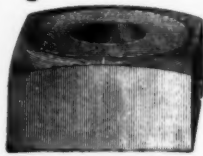


BUFFING LATHE.

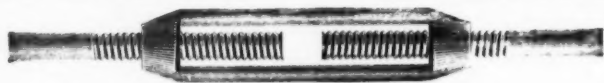
THE DIAMOND TOOL, FOR DRESSING OR TRUING  
— EMERY WHEELS. —

**RHODE ISLAND TOOL CO.**

PROVIDENCE, R. I.

**Gold Punched Machinery Nuts.**(CHAMFERED AND  
TRIMMED WITH  
DRILLED HOLES.)**Finished CASE-HARDENED NUTS**

(THREADS WARRANTED INTERCHANGEABLE.)

**DROP-FORGED TURN BUCKLES.****NORCROSS IRON BLOCKS.****Sail Makers' and Ship Chandlery Hardware.**

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**ROBT. WETHERILL & CO.**

CHESTER, PA.

ESTABLISHED 1872.

**Corliss Engine**

BUILDERS.

Condensing, Non-Condensing,  
Compound.  
Great Economy, Durability,  
Close Regulation.**BOILERS,**

Shafting and Gearing.

**CORLISS PUMPING ENGINES.**

—CITY WATER WORKS.—

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STEAM, GAS AND WATER

**Valves and Gates.****Fire Hydrants**

With or Without INDEPENDENT VALVES.

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INDIAN ORCHARD, MASS.

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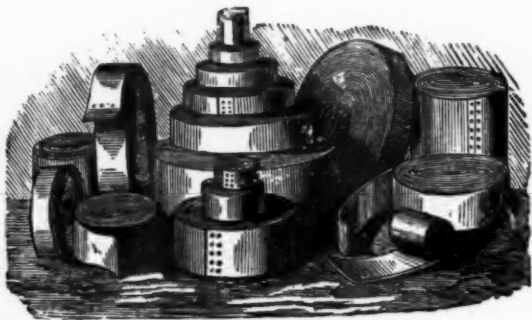
Mason Building, 72 Kilby and 112 Milk Sts., Boston.

ALL WORK GUARANTEED.

Send for Descriptive Circulars and Price-List. Correspondence solicited.

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MANUFACTURERS OF

**Pure Oak-Tanned Leather Belting.**SOLE AGENTS FOR  
T. K. Earle Mfg. Co.'s Card Clothing,  
AND DEALERS IN  
RUBBER and COTTON BELTING.DEALERS IN  
Cotton and Woolen Mill Supplies,  
No. 38 S. Charles Street,  
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—ESTABLISHED

1774.—

**FLOURING****MILLS.**

BUHRS 1774.

ROLLS 1882.

This Company owns and operates three Mills, as follows:

Patapsco Mill A, Ellicott City, Md.

Patapsco Mill B, Baltimore, Md.

Patapsco Mill C, Orange Grove, Md.

—Having a daily capacity of 1,500 barrels.—

The value of Flour depends on the proportionate quantity of Gluten, Starch, Sugar and Phosphate of Lime Maryland and Virginia Wheat, from which our Patent Roller Flours are manufactured, is unequalled for its purity and superior quality of alible properties.

ASK YOUR GROCER FOR

Patapsco Superlative Patent. Patapsco Choice Patent. Patapsco Family. Cape Henry Family.

Patapsco Extra. North Point Family. Chesapeake Extra. Bedford Family. Orange Grove Extra.

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**“CAMARET” ROOFING.**

THE sale of nearly 20,000 boxes of “CAMARET” Brand of Roofing Plates in the past year by this house, is sufficient evidence of the appreciation of the quality of this plate. We now guarantee every sheet in a box of “CAMARET” to stand any test of bending required—to be well asorted—to be free from wasters—or boxes to be held subject to our order.

The Palm Oil Coating renders it less liable to rust than any plate in the market except extra coated plates. We are the direct importers of the “CAMARET” Brand from the Makers, and carry a full stock of IC 14x20, IX 14x20, IC 20x28, IX 20x28.

Our prices will be made low. Samples sent on application.

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In \* Every \* Instance.

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